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The relationship was analyzed of the characteristics of adaptability, vocational interests, and academic achievement of 77 Virginia agricultural extension agents to their tenure and performance. The agents were grouped on the basis of short, medium, or long tenure. Data were collected from personnel records of the state cooperative system, college transcripts, and through administration of the Adaptability Test and Strong Vocational Interest Blank. The two criterion variables (tenure and performance) were correlated against 129 independent variables. Analysis of variance was used to determine significance of differences between characteristics. No significant relationship was found between length of tenure and performance, or between adaptability, or overall academic grade point average, and performance. There was a significant negative relationship between number of academic credit hours in education and agricultural education and the grade point average in psychology for the undergraduate curriculum and performance ratings. Extension agents have vocational interests most similar to farmers, forest service men, YMCA physical directors, and school superintendents. The psychological tests failed to discriminate between more or less effective agents. (pt)

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# An ANALYSIS OF THE RELATIONSHIP OF CERTAIN EMPLOYEE CHARACTERISTICS TO TENURE AND PERFORMANCE OF SELECTED VIRGINIA EXTENSION AGENTS-AGRICULTURE.

Donald Jerome Moore

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AN ANALYSIS OF THE RELATIONSHIP OF CERTAIN EMPLOYEE CHARACTERISTICS TO TENURE AND PERFORMANCE OF SELECTED VIRGINIA EXTENSION AGENTS-AGRICULTURE

by

Donald Jerome Moore

Thesis submitted to the Faculty of the Graduate School
of the University of Maryland in partial fulfillment
of the requirements for the degree of
Master of Science
1967

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ABSTRACT

Title of Thesis: An Analysis of the Relationship of Certain Employee Characteristics to Tenure and Performance of Selected Virginia Extension Agents-Agriculture

Donald Jerome Moore, Master of Science, 1967

Thesis directed by: Professor E. R. Ryden

A major problem and concern of administrators and supervisors of the Cooperative Extension Services is the lack of criteria for use in selecting applicants for employment which will indicate how the prospective employee will perform on the job and how long he will stay on the staff.

The overall objective of this study was to determine the relationship of certain employee characteristics to the tenure and performance of selected extension agents-agriculture in Virginia. Three groups were constituted to represent short, medium and long tenure. There were finally 77 agents in the three groups. The same agents were also ranked on the basis of performance ratings and formed into three performance groups--low, medium and high.

Employee characteristics considered were adaptability, vocational interests and academic accomplishments. Two criterion variables, one for tenure and one for performance, were used. One hundred twenty-nine independent variables were identified in the data and correlated against the two criterion variables. Also, an analysis of variance was used to determine the significance of differences between the characteristics of the two sets of three groups.

Findings of the study led to the following conclusions with reference to the population in question:

Employees with longer tenure are not also significantly higher performers.

There is no significant relationship between adaptability or overall academic grade point average and performance.

There is a significant negative relationship between the number of academic credit hours in education and agricultural education, and the grade point average in psychology, for the undergraduate curriculum, and the performance ratings of Virginia extension agents-agriculture.

The vocational interests of Virginia extension agents-agriculture are more nearly like those of farmers, forest service men, Y.M.C.A. physical directors, and school superintendents. Their vocational interests are mature and stable, and they are highly professional.

The Adaptability Test and the Strong Vocational Interest Blank failed to discriminate between the more effective and less effective Virginia extension agents-agriculture.

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The author is indebted to Dr. E. R. Ryden for his counsel and advice throughout this study and the entire graduate program.

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Thanks is due the National 4-H Service Committee and the Division of Extension Research and Training of the Federal Extension Service for their splendid job of conducting the National 4-H Fellowship program, and for providing materials and assistance in the conduct of this study.

A special thanks is also due Mr. P. H. DeHart, Associate Director, Virginia Cooperative Extension Service, for authorizing the study to be conducted in Virginia and providing certain financial support; Dr. M. C. Heckel, State Leader-Training, for helping to set up the study and collect the data; district agents for executing the paired-comparison ratings; and especially to the 77 extension agents-agriculture who participated as subjects in the study.

In addition, the computer time for this project was supported in full through the facilities of the Computer Science Center of the University of Maryland.

Furthermore, appreciation is also extended to James Fielder, long-time friend and avid sportsman, for reproduction of this report, and for arranging and conducting certain extra-curricular activities during the time of this study.

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CHAPTER I

INTRODUCTION

One of the most important functions of administrators and supervisors of the various Cooperative Extension Services of the United States is to attract and secure the services of capable and well-qualified workers. It is held by some writers that the progress likely to be made by the Extension Service in the future depends largely upon the caliber of the workers recruited.[1]

A major problem in selecting applicants for employment is the lack of criteria which will indicate how the prospective employee will perform on the job and how long he will likely stay on the staff.

An examination of some statistics prepared by the Federal Extension Service reveals that 5,518 county agricultural agents were on the job during the period January 1, 1965 through December 31, 1965. These figures do not include six states which do not request federal appointments for all new professional employees. Of the 5,518 agents reported, 478 were separated during 1965, resulting in a separation rate of 8.7 percent. A closer analysis of the data reveals a range from no separations in two states to a separation rate of 25.0 percent in two states.[2]

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[1] F. E. Rogers and Ann G. Olmstead (eds.), Supervision in the Cooperative Extension Service (Madison: University of Wisconsin, 1957), p. 40.

The same data referred to above show that in Virginia during 1965, there were 197 county agricultural agents on the job. Of this number, 25 separated during the period under consideration, resulting in a separation rate of 12.6 percent. It can readily be determined from this information that the turnover rate for county agricultural agents in Virginia was approximately 50 percent greater than that of the nation as a whole in 1965.[3]

There seems to be little information available regarding the cost of training and/or losing a professional worker, especially a professional extension worker. However, an article appearing in the Journal of College Placement in 1957 gave the following set of figures as an example of "first year" costs to recruit and train a fresh graduate:

Salary.	$3,600
Moving cost	500
Time of trainers and supervisors. . . .	1,500
Recruitment	400
	$6,000
Less net value.	1,000
	$5,000[4]

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[2] U. S. Department of Agriculture, Federal Extension Service, "Turnover of Cooperative Extension Agents During the Period January 1, 1965 through December 31, 1965," MO-51, February, 1966.

[3] Ibid.

[4] Wallace Jamie, "A Model Program for Corporate Recruitment," Journal of College Placement, Vol. XVII, Number 3, March, 1957.

This same article had this to say about the cost of losing a professional worker:

> A trainee that leaves his firm after two years of instruction, whether his program was on the job, learning by doing, or a more formalized classroom project, has probably cost the company \$8,000-\$20,000. These amounts would include his salary, an apportional part of the salary of those accountable for his instruction, the overhead cost of his office, his travel and other expenses, the expense of his recruitment, and several other smaller but not insignificant items of cost.[5]

Although these figures are somewhat out of date, they do help to form a framework in which to consider such costs. Also, these figures exemplify the costliness of recruiting and training new professional workers and, in turn, stress the cost of turnover. This cost puts a high value on the selection and orientation of new personnel. Therefore, it becomes important to try to arrive at some methods for predicting employee tenure and performance.

Statement of the Problem

Extension administrators and supervisors must rely on subjective information for the most part when selecting new employees. With the rapidly increasing complexities of technology, more accurate and discriminating methods of employee selection are needed.

The potential for professional development and improvement of the extension worker has recently become a major consideration, along with skills and abilities at the time of employment.

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[5] Ibid.

In view of these two emerging situations, a great need exists for the determination of a set of objective criteria which can be used to evaluate the skills, interests, abilities, and academic accomplishments of applicants, and a method for using these data to predict the probable performance and tenure of the applicant if he were to become a member of the extension staff.

Purpose of This Study

The major purpose of this study was to gather certain descriptive data concerning the characteristics of selected county agricultural agents in Virginia (since this study was designed, the title of county agents in Virginia has been changed to extension agent-agriculture; this title will be used throughout the remainder of this report), and to determine the relationship of these data to the agents performance and tenure.

There were two other purposes for conducting the study. First, the descriptive data furnished benchmark information and set some tentative norms regarding the skills, interests, abilities, and academic accomplishments of men extension agents in Virginia. These data could have definite implications for programs of professional development of the staff in Virginia.

Secondly, the characteristics of the agents found to have significant relationships to tenure and performance could be used as a basis for making recommendations for the establishment of a set of objective criteria for use in personnel selection. It would be possible to use these data to construct a prediction equation for tenure and performance.

Employee characteristics which were considered in this study included years employed by extension, age of agent, adaptability (or mental ability), vocational interests, specialization level, interest maturity, occupational level, masculinity, and academic accomplishments. Academic accomplishments were considered from the standpoint of number of academic credit hours attempted, number of academic credit hours failed, and the grade point average for the undergraduate curriculum; and for all academic work beyond the undergraduate curriculum. For both the undergraduate curriculum and all academic work beyond the undergraduate curriculum, data were gathered and analyzed on the number of academic credit hours attempted and the grade point average in the following categories: plant sciences, animal sciences, mechanical sciences, basic sciences, humanities, and social sciences. The social sciences were further broken down into the following categories for analysis: education; agricultural education; extension education; psychology; economics; sociology; communications; business and public administration; and history, political science and government.

Later in this report these characteristics will be referred to as variables for the sake of statistical analysis. A complete explanation of each and a listing can be found in Chapter III.

Objectives

The basic concerns of this study are expressed in the purpose. However, to make these concerns operational, they are stated below as objectives.

The objectives, then, of this study were:

1. To determine the relationship of certain employee characteristics to the tenure of selected Virginia extension agents-agriculture.
2. To determine the relationship of certain employee characteristics to the performance of selected Virginia extension agents-agriculture.
3. To establish benchmark information regarding the skills, interests, abilities, and academic accomplishments of extension agents-agriculture in Virginia.
4. To identify some areas in which the different tenure groups may need additional training.
5. To establish a set of objective criteria for use in personnel selection in Virginia which can be used as predictors of tenure and performance.

Hypotheses

This study has centered around certain hypotheses which, along with the objectives, have served as guides in setting up the framework for conducting and analyzing the study. These hypotheses were stated first as research (or content) hypotheses, and later as a null hypothesis (capable of being tested statistically).

Research Hypotheses.

1. Those employees having longer tenure will also have:
    a. Vocational interests more nearly like those of men successful in the following occupations, as shown by the Strong Vocational Interest Blank: Y.M.C.A Physical Director, Personnel Manager, Public Administrator, Vocational Counselor, Physical Therapist, Social Worker, Social Science Teacher, Business Education Teacher, School Superintendent, and Minister.
    b. A greater amount of formal academic training in the social sciences, and especially in education, extension education, agricultural education, psychology, sociology, and communications.
2. Those employees having higher performance ratings will also have:
    a. Higher adaptability, as shown by the Adaptability Test.
    b. Vocational interests more nearly like those of men successful in the following occupations, as shown by the Strong Vocational Interest Blank: Y.M.C.A. Physical Director, Personnel

Manager, Public Administrator, Vocational Counselor, Physical Therapist, Social Worker, Social Science Teacher, Business Education Teacher, School Superintendent, and Minister.

   c. Higher grade point averages for the undergraduate curriculum.
   d. A greater number of academic credit hours in the social sciences, and especially in education, extension education, agricultural education, psychology, sociology, and communications.

3. Those employees having shorter tenure and lower performance ratings will also have vocational interests more nearly like those of men successful in the following occupations, as shown by the Strong Vocational Interest Blank: Farmer, Carpenter, Forest Service Man, Aviator, Printer, Math-Science Teacher, Industrial Arts Teacher, Vocational Agriculture Teacher, Policeman, and Army Officer.

Null Hypothesis.

1. There will be no statistically significant relationship between tenure and performance and:
   a. Adaptability
   b. Vocational Interests
   c. Academic credit hours, and
   d. Grade point averages for the undergraduate curriculum.

Need for the Study

Probably the most important decisions made in extension are those determining the employment of new personnel. In fact, according to Kelsey and Hearne:

> No other function of the administrator is more important than the wise selection of personnel. The impression which the public will have of the Extension Service in his state will depend largely upon the men and women he selects. The effectiveness of his organization in rendering service will be determined almost wholly by the competence of his associates.[6]

At this period in the life of the Extension Service, it is not only important to have as many workers on the job as is financially possible, but it also is imperative that the quantity be matched or even surpassed with quality of personnel.

Frutchey has said:

> The effectiveness of an educational institution depends primarily upon its teachers. The effectiveness of the Cooperative Extension Service depends upon its county extension agents. A good county extension agent means a good program, good methods, and good results.[7]

Johnson and McCormick suggest the following elements as a logical approach to selection of personnel:

1. The initial contact
2. The application forms
3. Checking the background of the applicant

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[6] L. D. Kelsey and C. C. Hearne, Cooperative Extension Work (New York: Comstock Publishing Associates, 1955), p. 67.

[7] Fred P. Frutchey, The Development of an Aptitude Test for the Selection of County Agricultural Agents (Washington: U. S. Department of Agriculture, Federal Extension Service, 1965), p. 3.

4. The selection interview
5. Use of selection tests
6. Physical examination.[8]

In Virginia, the prospective employee is evaluated by the initial contact, the information contained in the application forms, and the selection interview. Also, some efforts are made to check into the background of the applicant by requesting letters of recommendation and personal contact, when possible, with others who may be familiar with the applicant's background.

The American Association of Examiners and Administrators of Educational Personnel has had this to say concerning personnel work:

> Scientific studies, as well as experience, have proved that subjective human judgments are fallible. This is especially true when one person attempts to judge another. . . . Personal idiosyncrasies, both on the part of the judge and the applicant, insinuate themselves into the conclusion with the result that the decision is unsound. As a consequence, every effort should be made to increase the area of substantial judgment. . . . The evidence on which the final judgment is based should be, as far as practicable, objective, comparable, and free from individual personal bias.[9]

Again, Johnson and McCormick have issued some cautions regarding the staffing process. They say:

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[8] Alton C. Johnson and Robert W. McCormick, Staffing Decisions in the Cooperative Extension Service (Madison, Wisconsin and Washington: National Agricultural Extension Center for Advanced Study and the Division of Management Operations, Federal Extension Service, July, 1962), p. 56.

[9] American Association of Examiners and Administrators of Educational Personnel, Principles and Procedures of Teacher Selection (Cincinnati: Tri-State Offset Co., 1952), p. 19.

> If staffing is conducted on a hit-or-miss, haphazard basis, deleterious effects may befall the individuals who are involved in the process as well as the organization which is attempting to assemble and develop an effective staff. Unless staffing decisions are realistic, employees may be assigned to positions where they are unable to utilize their talents to the fullest and thus would be unable to make their maximum contribution to the organization and to society.
>
> One must be careful not to interpret the staffing process as being equivalent to "job filling." There is a significant difference between "job filling" and the recruitment, selection, and development of an effective staff which can achieve the organizational objectives.[10]

Extension personnel methods for selection of new employees have been subjective, but it seems extension personnel officers and the procedures they use are becoming more sophisticated. Some states are now using tests and instruments of various kinds to assess the ability and qualifications of the applicant and predict his probable performance.

Attention was focused in this direction in 1961 when the National Extension Research Seminar prepared a report stating:

> Scientifically derived information is needed by extension administrators for making decisions about the general personnel program. Sound policies, procedures, and practices need to be developed that will facilitate the employment of persons who have the necessary qualifications to fill adequately the positions for which they are selected and who have the potential to assume additional responsibilities in the organization.[11]

Certain qualifications or characteristics in the selection of agents can be identified and assessed so as to be indicative of probable performance and effectiveness.

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[10] Johnson and McCormick, op. cit., pp. 10-11.

[11] National Extension Research Seminar (Purdue University, Lafayette, Indiana, April 18-21, 1961), p. 108.

Although individual differences do exist in any population, some extension agents tend to be more effective than others. So, ". . . if means could be devised to select for county agent positions only men similar to the most effective agents, the educational results achieved by extension would be greatly increased."[12]

Then how can applicants be screened effectively? What procedures should be used to accomplish the selection process? How can the data secured from each procedure be accurately weighed in arriving at a decision to hire an applicant?

One of the elements which Johnson and McCormick recommended in their approach to selection of personnel was the use of selection tests. Individual differences can be measured by testing. Establishing differences related to tenure and effectiveness as extension agents through written tests and other objective data would be highly desirable. This study was an effort to determine the relationship of several such characteristics to agent effectiveness.

Scope of the Study

Early in this study, the decision was made to use clear-cut objective data insofar as was feasible.

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[12] Ivan Nye, The Relationship of Certain Factors to County Agent Success, University of Missouri College of Agriculture, Agricultural Experiment Station Research Bulletin 498 (Columbia, Missouri: University of Missouri, 1952), p. 3.

Fortunately, it was possible to enforce this decision throughout the study.

An eclectic approach was taken in the selection of independent variables to compare with the criterion, or dependent, variables. Consequently, the independent variables chosen--basically, adaptability, vocational interests, and academic accomplishments--are those which have been found in parts of various studies to have a significant relationship to the dependent variables--tenure and performance.

The data were collected from a comprehensive survey of college transcripts, and the administration of the Adaptability Test and the Strong Vocational Interest Blank-Men. The criterion data were gathered from personnel records and the rating of agents by supervisors according to the paired-comparison technique.

The primary purpose of the study was to determine relationships of the independent variables to the criterion, or dependent variables, and not to validate any particular instrument or procedure. Therefore, a simple correlation program was used for the statistical analysis, in addition to an analysis of variance.

Limitations

The author feels there have been two basic limitations in this study. First, it was deemed necessary to use a sample of agents rather than the entire male county staff. Some variables which might conceivably have been significant with the entire staff could not be accurately analyzed for the lack of sufficient information. The study included 77 of the 197 members of the male county staff. For some of the analyses, the sample was divided into three groups, resulting in a rather small N.

Secondly, within the author's knowledge, no instruments have been validated for the purpose of accurately relating personality characteristics of extension agents to any dependent variable. Therefore, it was not possible to use an instrument to assess this important area.

Assumptions

The basic assumption inherent and necessary in this study was that district supervisors are knowledgeable regarding the effectiveness of extension agents-agriculture and would be objective and unbiased in executing the performance ratings.

Organization of the Study

Chapter I consists of a brief review of the background of the problem and need for the study, statement of the objectives and hypotheses, mention of the scope and certain limitations of the study, and the basic assumption.

Chapter II contains a review of selected research related to this investigation.

Chapter III describes the design of the study and methods used.

Chapter IV contains a presentation and discussion of the findings within the hypothetical framework.

Chapter V contains a presentation and discussion of some interesting and pertinent findings outside the hypothetical framework.

Chapter VI is a summary of the total study with a statement of conclusions and recommendations for use of the findings and for further study.

CHAPTER II

REVIEW OF SELECTED RELATED RESEARCH

Several studies have been conducted in extension in an effort to find dependable methods for predicting performance of extension agents. Generally, they have been concerned with only some of the characteristics involved in the present study. A brief review of some of these studies follows.

In Missouri, Nye tested the hypothesis that success in county extension work can be predicted from a combination of known factors about an individual's background, training, intelligence, vocational interests, attitudes, and other personality characteristics. His findings revealed that college grades may have some association with agent success, but he added, "it is clear that a knowledge of an individual's vocational interests leaves a great deal unknown concerning his potential effectiveness as an agent."[1] However, the Missouri County Agent Inventory which Nye developed in the study was found to have a high relationship with the performance ratings of Missouri county agricultural agents.

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[1] Ivan Nye, The Relationship of Certain Factors to County Agent Success, University of Missouri College of Agriculture, Agricultural Experiment Station Research Bulletin 498 (Columbia, Missouri: University of Missouri, 1952), pp. 20-21.

It is considered that "from the scores on the inventory, one could tell pretty well the ratings of the agents."[2]

Because of Nye's findings in Missouri, a study was set up and conducted to further test the Missouri Inventory in fifteen states. Frutchey reported:

> The results were disappointing. It is plain to see that the Inventory did not differentiate between the more effective and less effective agents. . . . In none of the states did the Missouri County Agent Inventory have sufficient prediction power to be useful in the selection of agents.[3]

Since the Missouri County Agent Inventory did not prove to be a good instrument for selecting county agricultural agents, each of the fifteen states developed its own instrument from an analysis of the responses to the questions in the Missouri Inventory. This was highly successful. There was found to be a high relationship (.90) between the new instrument for each state and the performance of its beginning agents. So, although a "national" instrument was not highly successful, individual instruments were very highly related to performance.[4]

Stauffer, in Pennsylvania, attempted to identify factors related to effectiveness of county extension agents by examining the ability of the Missouri County Agent

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[2] Fred P. Frutchey, The Development of an Aptitude Test for the Selection of County Agricultural Agents (Washington: U. S. Department of Agriculture, Federal Extension Service, 1965), p. 4.

[3] Ibid., p. 7.

[4] Ibid., pp. 8-9.

Inventory to predict effectiveness of county agents, and to determine the relationship between undergraduate training and the subsequent effectiveness of county agents. He concluded that (1) the Missouri County Agent Inventory failed to discriminate among three groups of agents rated on effectiveness, (2) the number of college credits taken in selected areas of study did not significantly influence rated effectiveness as an extension agent, and (3) the grade point average in selected areas of study did not significantly influence the rated effectiveness of an extension agent.[5]

In a Michigan study, Posz and Stone found that scholastic achievement was not positively correlated with the success of county agricultural agents. A positive correlation, although not high, was found between academic achievement and success among 4-H agents. The study failed to show a positive relationship between success on the job and the number of credit hours of work taken in technical agriculture.[6]

In another Michigan study, Axinn was concerned with validating a battery of tests for use in personnel selection. Tests used in the study were the Strong Vocational Interest

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[5] Robert H. Stauffer, "Pre-Employment Factors Associated with the Rated Effectiveness of a Selected Group of Pennsylvania County Agents" (unpublished Master's thesis, Pennsylvania State University, 1963).

[6] A. Conrad Posz and John T. Stone, "Can You Predict Success from Academic Records?," Cooperative Extension Service (East Lansing: Michigan State College, 1953), pp. 1-4. (Mimeographed.)

Blank-Men, the Bernreuter Personality Inventory, and the Otis Self-Administering Test of Mental Ability. Axinn summarized his study by saying, "this study has not validated these tests for use in selecting prospective county Extension personnel."[7]

In 1960, Swan conducted a study in Michigan and New York to determine if value patterns of more effective agents were different from value patterns of less effective agents, when agents were ranked in order of overall effectiveness by their supervisors. It was considered that if value patterns between the two groups of agents were found to be significantly different, the values could be used as a variable in predicting success in county extension work. The Prince Differential-Values Inventory was used to measure the values of the subjects. It was concluded that the D-V Inventory was not valid for predicting success in county extension work.[8]

Warren found that in the Oklahoma Cooperative Extension Service those employees considered to be most successful by administrators and supervisors undertook a much broader field of study in their undergraduate and graduate programs than did those persons who were considered unsuccessful.

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[7] George H. Axinn, Personnel Testing for the Michigan Cooperative Extension Service, Miscellaneous Publication 301, Federal Extension Service, Division of Research and Training (Washington: U. S. Department of Agriculture, 1957), p. 24.

[8] John Curtis Swan, "A Study of Values as a Differential Characteristic of More Effective and Less Effective County Extension Agents" (unpublished Master's thesis, Michigan State University, East Lansing, 1960).

Most of the study was devoted to establishing the relationship of college credits to success as an extension agent. He found that the extremely high F values observed in such fields as education, communications and sociology bear out the contention that human relation skills are more important for people in this line of work than exclusive emphasis on technical agriculture. It did not matter how much knowledge a person had in a given technical area if the person could not interpret and communicate this knowledge to persons who could benefit from it.[9]

Sundaraj found in a study with 229 Tennessee county agricultural agents, that five of sixteen factors were fairly consistently related to job performance. They were: (1) average undergraduate grade point earned, (2) credit hours of undergraduate educational coursework completed, (3) years of extension work served, (4) average graduate grade point earned, and (5) average graduate social study grade point earned.

Sundaraj further identified five factors as being nonsignificant, or unrelated to performance. They were: (1) credit hours of undergraduate technical coursework completed, (2) average grade point earned in technical coursework, (3) credit hours of graduate social study coursework completed, (4) average grade point earned in graduate technical coursework, and (5) credit hours of graduate educational coursework completed.[10]

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[9] A. G. Warren, "A Study of Some Training Factors Associated with the Success or Failure of Cooperative Extension Workers" (unpublished Ed. D. thesis, Oklahoma State University, 1960), pp. 45-46.

Dotson continued and expanded the investigation initiated by Sundaraj in Tennessee. Of the twenty-two factors considered, six were found to characterize "high performing" men agents. They were: (1) they had relatively high average undergraduate grade points (3.0 or above on a 4.0 system), (2) they had satisfactorily completed 10 or more hours of graduate work with an average grade point of 3.4 or above, (3) they belonged to two or more professional and one or two scholastic organizations, (4) they had received at least one award or honor, (5) they were 30 or more years of age and had completed from 10 to 20 or more years of extension work, and (6) they were married and had children.[11]

In a study with 4-H agents in Louisiana, Gassie tested 64 factors to determine if there was a significant relationship between each factor and the level of job performance of 4-H agents. He found a significant relationship between a high undergraduate grade point average in social science and high job performance. He concluded that "high performance as well as low performance agents in this study possessed essentially the same characteristics." Furthermore, he said, "this study fails to provide a conclusive basis for establishing a definite group of factors for evaluating applicants for 4-H Club work. . . ."[12]

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[10] S. M. Sundaraj, "A Study of Relationships Between Selected Factors and Job Performance Ratings of Tennessee County Agricultural Extension Agents" (unpublished Master's thesis, The University of Tennessee, Knoxville, 1962).

[11] Robert S. Dotson, "Selected Factors Related to Two-Year (1960-1961) Average Job Performance Ratings of Tennessee County Extension Workers" (Knoxville: The Tennessee Agricultural Extension Service, 1964).

Some of the most extensive investigation in the area of performance prediction of extension personnel has been conducted in Indiana under the direction of Dr. E. R. Ryden. Two studies, conducted as a part of this overall personnel research program, will be reviewed here.

Gosney used the Strong Vocational Interest Blank to determine the differences in interest patterns between county agricultural agents and assistant county agricultural agents, and to determine whether or not Indiana county extension agents have a unique pattern of vocational interests. He reported the results of his study as follows:

> 1. There were no significant differences in mean scores obtained by County Agents and Assistant County Agents, with 38 of the 48 scales showing no difference at the .05 level.
> 2. The extension agent group did exhibit a more or less unique interest pattern, when compared with the patterns of the Agriculture Freshmen and Men-in-General groups. There were 17 scales which showed differences at the .001 level in comparison with both the Agriculture Freshmen and Men-in-General.[13]

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[12] E. W. Gassie, "Factors Associated with Job Performance of Assistant County Agents Doing 4-H Club Work, Louisiana, 1964" (unpublished Ph.D. dissertation, Louisiana State University, Baton Rouge, 1965).

[13] Charles A. Gosney, "Vocational Interest Patterns of Indiana County Agricultural Extension Agents" (unpublished Master's thesis, Purdue University, Lafayette, Indiana, 1963), p. 9.

Bluhm continued the Indiana research by studying several tests in the hope that they might provide a valid predictive measurement of male county extension personnel success. He studied the Adaptability Test (AT), the Strong Vocational Interest Blank (SVIB), and the Thurstone Temperament Schedule. Scores on each of these three instruments were correlated with overall job performance as determined by supervisor ratings using the method of paired-comparisons. He concluded that:

> The *Adaptability Test* and the *Strong Vocational Interest Blank* have potential value as an aid in the selection of county extension personnel, that the *Adaptability Test* and the Aviator scale of the *Strong Vocational Interest Blank* appear to have additional value when used as a multiple predictor, that the *Thurstone Temperament Schedule* needs further study before assessing its value in the county extension personnel selection process, and that the method of paired comparisons appears to be a reliable technique for rating county extension agents.[14]

In summarizing the work at Purdue in the *Journal of Cooperative Extension*, Ryden indicates the following findings:

1. There was a high correlation between agents scores on the Adaptability Test and the Graduate Record Examination.

> Since the Graduate Record Examination is widely used for appraising the suitability of students applying for admission to graduate school, and since agents are encouraged to

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[14] Wilbur R. Bluhm, "An Examination of Three Tests for the Selection of County Extension Personnel" (unpublished Master's thesis, Purdue University, Lafayette, Indiana, 1964), pp. vii-viii.

> undertake advanced study as part of their professional improvement, scores on the AT are somewhat indicative of a person's suitability for graduate study.[15]

2. There was also found to be a significant, positive relationship between scores on the Adaptability Test and job proficiency ratings. This finding indicates that "the probability of an applicant becoming a successful county agent could be estimated on the basis of his score on the AT."[16]
3. Furthermore, a significant relationship was found between overall grade point average in college and job performance ratings of county extension agents.

As a result of these studies, Ryden feels that when the Adaptability Test and the college grade point average are used together, they have reasonable accuracy in predicting which job applicants will eventually become successful agents. In fact, a method has been devised for use in Indiana which combines the AT score and college grade point average in a predictive scheme.

Ryden further analyzed the findings in the study by Gosney, to determine if certain of the scales of the Strong Vocational Interest Blank were related to tenure. He found that six scales could be used for classifying people in terms of long or short tenure. The scales were Farmer, Public Administrator, Y.M.C.A. Secretary, City School Superintendent, Musician, and Life Insurance Salesman. He suggests that by combining the scores on these six scales, it would be possible to establish a predictive function for tenure.

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[15] E. R. Ryden, "Predicting Successful Performance," _Journal of Cooperative Extension_, Vol. III, No. 2, Summer 1965, p. 104.

[16] _Ibid._, p. 105.

Attempts to find measures of personality and attitude that would correlate with job performance ratings were unsuccessful. However, it was found that the Aviator scale of the Strong Vocational Interest Blank is highly related to performance.

Efforts are now underway to combine the Adaptability Test, college grade point average, and the Aviator scale of the Strong Vocational Interest Blank into a more accurate and efficient prediction equation.[17]

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[17] *Ibid.*, pp. 103-109.

CHAPTER III

RESEARCH DESIGN AND METHODOLOGY

The primary purpose of the study was to determine the relationship of certain employee characteristics to the performance and tenure of selected Virginia extension agents. The study was conducted in approximately the same order in which the following discussion progresses.

Population

The subjects in the present study consisted of 77 employees of the Virginia Cooperative Extension Service. All were classified extension agent-agriculture. All the subjects were professional people and had nonspecialized county positions throughout Virginia.

The 77 agents were grouped in two ways for this study--first on the basis of tenure, and, second, on the basis of performance. These groupings will be discussed presently.

The agents were selected for this study systematically. After the selection, each one was advised that he had been selected for the study by the State Leader for Training in Virginia. The plans for the study were explained and the agents were given the privilege of choosing to participate or not to participate. They were assured that in no way would any employee be at a disadvantage by participating in the study, nor would any information be released, either formally or informally, which might conceivably identify any individual.

As initially planned, there would have been 90 agents in the study. However, 13 chose not to participate, leaving the present sample of 77.

Determination of Dependent Variables

As set forth in Chapter I, the selection of personnel who will be effective employees and remain on the staff for a reasonable length of time is among the important concerns of administrators and supervisors of the Cooperative Extension Services. Therefore, it was felt that a worthwhile contribution could be made to this field if employee characteristics which have a significant relationship to performance and tenure could be identified. The two factors of tenure and performance were then selected as the dependent, or criterion, variables for this study. The following methods were used for establishing values for these two variables.

Tenure. It was felt that in order to study tenure, three classifications of tenure should be used. On this basis, three groups were constituted with 30 agents in each group.

Group I began with agents who were employed up to March 7, 1966--the date on which the tenure groups were constituted. To get 30 men in this group, it was necessary to go back to July 1, 1962. Six of the men falling into this group chose not to participate, leaving a total N of 24. This group is referred to as the Short Tenure Group.

Group II, or the Medium Tenure Group, consisted of agents who were employed between June 30, 1961 and January 1, 1957 to obtain the necessary number. Only one agent in this group chose not to participate in the study, leaving an N of 29.

Group III, or the Long Tenure Group, consisted of agents who were employed between March 1, 1945 and June 30, 1951 in order to get the 30 members. Six men in this group also chose not to participate in the study, leaving an N of 24.

Performance. The 77 agents resulting from the constitution of the three tenure groups were considered as the sample for the study. The performance of these men was used rather than constituting additional groups strictly on the basis of performance.

Periodically, the district agents rate all employees under their supervision according to a system used for all state employees. Under this system, the employee is rated poor, fair, good, very good, or excellent, for each of the following elements: habits of work, amount of work, quality of work, cooperation, intelligence, and initiative. A numerical score is derived from this scoring process, and is called the Service Rating Score.[1]

It was originally intended to use the Service Rating Scores for establishing performance levels. However, when the scores resulting from ratings made early in 1966 were obtained and analyzed, it appeared there was little discrimination. The scores had a range from 78 to 92, and when divided into thirds, less than three points separated the high and low groups. It became apparent that a method of rating which provided more dispersion was needed.

When the Service Rating Score failed to discriminate as precisely as was needed for this study, the Lawshe-Kephart Personnel Comparison System was selected as an appropriate method by which to obtain performance ratings. This method is sometimes referred to as the paired-comparison rating scale. This system has been devised for making overall comparisons or ratings of any group of employees who are performing like or similar jobs and who are all working under the same supervisor. Each employee on a given job is paired and compared with every other employee on that job. For each pair of names the rater indicates which of the two persons is superior in job performance. A tally is then made to determine the total number of times each employee was chosen over others in the group. From this, a performance rating index is derived.[2]

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[1] Commonwealth of Virginia, Governor's Office, Service Rating of State Employees Under the Virginia Personnel Act, Division of Personnel, Richmond, Virginia, July 1, 1949.

The Personnel Comparison System forces the dispersion of scores to an interval scale so that all employees can be ranked with meaning. Gassie[3] quoted Newman as having this to say about the ranking system:

> It avoids the confusion of one rater using the word "good" to mean the same thing that another does by "excellent." It also catches the rater who wants to put everybody in the same grade. Moreover, it stresses the difference between individuals, which is usually the significant thing.[4]

Cassell compared the reliability of the paired comparison technique and a scaled check list instrument in evaluating relative job performance and found, generally, that the paired comparison technique was superior to the scaled check list in most respects.[5]

In order to facilitate the preparation of the pair cards and the actual rating, the punched card procedure devised by Kephart and Oliver was used. With this procedure, the names of the employees who make up each pair are punched on IBM cards. The rater then marks his choice directly on the card.[6]

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[2] C. H. Lawshe and N. C. Kephart, Manual for Use with the Lawshe-Kephart Personnel Comparison System, Occupational Research Center, Purdue University, Lafayette, Indiana, 1950.

[3] E. W. Gassie, "Factors Associated with Job Performance of Assistant County Agents Doing 4-H Club Work, Louisiana, 1964" (unpublished Ph.D. dissertation, Louisiana State University, Baton Rouge, 1965), p. 16.

[4] William H. Newman, Administrative Action (New York: Prentice Hall, Inc., 1951), p. 341.

[5] Roy Dale Cassell, "The Effects of Supervisory Training upon the Reliability of Two Appraisal Instruments in Evaluating the Relative Job Performance of County Extension Agents" (unpublished Ph.D. dissertation, University of Wisconsin, Madison, 1962), pp. 71-87, 125-128.

The cards were made up for each of the six extension districts in Virginia. Within each district, each agent in the study was paired with every other agent. The cards were then sent to each of the six district extension supervisors with the instructions for performing the ratings. The supervisors were asked to rate the agents according to the following criterion: Which of these two extension workers is more effective in his extension job at the present time?

The choices of the supervisors were tallied by hand and a performance rating index established for each employee according to a table of values established by Lawshe and Kephart.[7] This performance rating index is the one which has been used throughout the study.

Three performance groups were constituted using the performance rating indices, but including the same employees as in the tenure groups. Coincidentally, the performance groups resulted in the same number of employees per group as were in the tenure groups.

Group I, or the Low Performance Group, had indices ranging from 25 through 45. This group included 24 agents.

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[6] N. C. Kephart and James E. Oliver, "A Punched Card Procedure for Use with the Method of Paired Comparisons," _Journal of Applied Psychology_, Vol. 36, No. 1, February, 1952, pp. 47-48.

[7] Lawshe and Kephart, _op. cit._

Group II, or the Medium Performance Group, had indices ranging from 46 through 54. This group included 29 agents.

Group III, or the High Performance Group, had indices ranging from 55 through 75. This group included 24 agents.

The indices derived by the authors of the system range from 25 through 75.

Both the Service Rating Score and the Performance Rating Index were used in the analysis of the data. However, the Performance Rating Index was used as the criterion for performance. The results are discussed in Chapters IV and V.

Determination of Independent Variables

It was fortunate that information from several previous studies which had been conducted in this area of investigation was available. Although these studies had not been completely successful in establishing relationships of employee characteristics to performance and tenure, most had found some significant relationships. Since this information was available, it seemed advisable to include in this study a combination of only those factors which other research had found to be related to the criteria.

Those characteristics which were selected for studying were adaptability, or mental ability; vocational interests; and academic accomplishments. Other studies have shown that adaptability can be rather accurately assessed by the Adaptability Test, and that vocational interests of adults are well defined through the use of the Strong Vocational

Interest Blank. Both of these instruments are discussed later. Academic accomplishments were evaluated by a thorough analysis of the college transcript of each of the agents. Each of these three areas will now be discussed.

Adaptability. Adaptability as used here is synonymous with mental ability.

The Adaptability Test developed by Tiffin and Lawshe was chosen as the instrument to use in determining mental ability. This test is designed to measure mental adaptability or mental alertness. It is principally used as an employment aid to identify persons who are rapid learners from other persons better suited to simple, routine jobs.

The AT is a self-administering 15-minute test consisting of thirty-five items arranged in order of increasing difficulty. It is available in two comparable forms, A and B.

The authors indicate the reliability to be .90 for Form A and .88 for Form B. Correlation coefficients have been established with other standardized tests as follows: The Ohio State University Psychological Examination, .78; Otis Self-Administering Test of Mental Ability, .73; and Wonderlic Personnel Test, .79.[8]

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[8] Joseph Tiffin and C. H. Lawshe, Examiner Manual for the Adaptability Test (Chicago: Science Research Associates, 1954).

Buros lists sixteen references for this test in The Fifth Mental Measurements Yearbook, indicating that it has been fairly well researched and analyzed.[9]

As reported by Ryden and discussed in Chapter II, the AT has been tested quite rigorously and extensively by the Indiana Cooperative Extension Service, and found to correlate highly with the Graduate Record Examination, as well as with job performance of Indiana extension personnel.[10]

Vocational Interests. According to Ryden, "Interests tend to become stable during later adolescence. Interest inventories have been developed mainly to facilitate making educational and vocational decisions over a period of time."[11]

The Strong Vocational Interest Blank (SVIB) was chosen to assess the vocational interests of the extension agents in this study.

The SVIB is an inventory of 400 items constructed in such a way that the responses are transformed into a standard score for 51 occupations, five groups of occupations and four non-occupational scales.

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[9] Oscar K. Buros, The Fifth Mental Measurements Yearbook (Highland Park, N. J.: The Gryphon Press, 1959), p. 421.

[10] E. R. Ryden, "Predicting Successful Performance," Journal of Cooperative Extension, Vol. III, No. 2, Summer 1965, p. 104.

[11] E. R. Ryden, "The Strong Vocational Interest Blank for Women" (College Park: University of Maryland, 1965), p. 1.

The inventory is standardized in terms of the interests of men known to be successful in their own occupation. Then the standard score obtained on each scale indicates, not the amount of interest possessed, but the likelihood that a person does or does not have the interests of men in that particular occupation.[12]

The average correlation of reliability is .877. Permanence measured by test-retest correlations over an 18-year period ranges among 17 scales from .79 to .48, with a median of .69. In the most recent manual for the inventory, Strong stated: "It is doubtful if any type of test, excepting intelligence tests, has greater permanence over long periods of time than is shown by interests tests."[13]

The SVIB is one of the most extensively researched of testing devices. In The Sixth Mental Measurements Yearbook, Buros lists 614 references to it.[14]

Edward K. Strong, Jr., the author of the SVIB, and his associates have researched the instrument for over thirty years. Campbell, one of the associates, recently reported that with longitudinal follow-up studies, they had found interests measured by the SVIB to be very stable over a thirty-year period. Dramatic stability was found for bankers and lawyers.[15]

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[12] Edward K. Strong, Jr., Strong Vocational Interest Blanks Manual (Palo Alto, California: Consulting Psychologists Press, 1959).

[13] Ibid., p. 20.

[14] Oscar K. Buros, The Sixth Mental Measurements Yearbook (Highland Park, N. J.: The Gryphon Press, 1965), pp. 1299-1305.

As far back as 1937, Bingham reported the SVIB as "the most dependable means available for ascertaining the similarity between a person's interests and those of people actually engaged in specific occupations on the professional level," and "(it) is one of the most valued aids to counseling which prolonged scientific research has produced."[16]

Astin reviewed the SVIB for The Sixth Mental Measurements Yearbook and had this to say about it: ". . . there is . . . little doubt that the SVIB remains as the best constructed and most thoroughly validated instrument of its kind."[17]

Furst also reviewed the SVIB for the latest edition of the Yearbook. He reported: ". . . the Strong remains a solidly based but rather complex inventory suitable mainly for older adolescents and adults considering higher level occupations."[18]

In 1959, all of Strong's original criterion data, consisting of about 40,000 completed inventories, were transferred from Stanford University to the Center for Interest Measurement Research at the University of Minnesota. There it was prepared for computer input and analysis.

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[15] David P. Campbell, "The Stability of Vocational Interests Within Occupations over Long Time Spans," The Personnel and Guidance Journal, Vol. XLIV, No. 10, June 1966, pp. 1012-1019.

[16] Walter V. Bingham, Aptitudes and Aptitude Testing (New York: Harper and Brothers, 1937), pp. 72, 357.

[17] Alexander W. Astin in Buros, op. cit., p. 1304.

[18] Edward J. Furst in Buros, op. cit., p. 1305.

David P. Campbell, Director of the Center, reports that the Center is revising the SVIB and the revision will be available in late 1966. It will include some new scales and approximately 100 new or rewritten items. "None of the revision work will create any major change in the use of the SVIB for counseling," according to Campbell.[19]

There is no scale on the SVIB for county extension agent. However, the inventory can still be very useful by showing which of the scales county extension agents tend to be most like. Then in personnel selection, the administrator would look for applicants who scored high on the same scale(s) on which the high performing agents scored--all other factors being equal.

Academic Accomplishments. The phrase "academic accomplishments" has been used herein to encompass a great number of factors. The data used in this part of the study were derived by a very thorough analysis of the college transcripts of the agents.

The design for this part of the study was patterned closely after that of a study conducted by Harlan Copeland of the Federal Extension Service, to serve as a benchmark for their curriculum development project.

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[19] David P. Campbell, "The 1966 Revision of the Strong Vocational Interest Blank," The Personnel and Guidance Journal, Vol. XLIV, No. 7, March 1966, pp. 744-749.

The procedure used was one of setting up categories, or classifications, into which all college courses could be placed. Then the credit hours and grade for each course were abstracted from the transcript and recorded on forms prepared for this purpose. The name of the course, credit hours, and grades were recorded for the social sciences in order to have sufficient information to test the hypotheses. Only the credit hours and grades were recorded for all categories.

Six broad categories were set up into which were placed the courses taken in college. They were: plant sciences, animal sciences, mechanical sciences, basic sciences, humanities, and social sciences. The social sciences category was further broken down into the following categories: education; extension education; agricultural education; psychology; economics; sociology; communications; business and public administration; and history, political science, and government. A category was used for "other" which included all courses which could not be placed in one of the specific categories. Only an occasional course had to be placed in the "other" category, except for physical education and military courses. Therefore, this category was not used in the analysis, except for computing data for the total curriculum.

The transcript information was abstracted, recorded and analyzed in the fifteen areas named above for the undergraduate curriculum, and for all formal training beyond the undergraduate curriculum, separately.

The kinds of courses and areas of study included in each of the categories were essentially the same as those in the Federal Extension Service study.[20] The name of each category and a listing of the kinds of courses included which were used in the present study, are as follows:

A. Plant Sciences--Included agronomy, soils, farm crops, horticulture, forestry, plant pathology, plant psysiology, plant genetics, and any other applied plant science.

B. Animal Sciences--Included animal husbandry, veterinary medicine, dairy husbandry, poultry husbandry, dairy manufacturing, animal pathology and physiology, anatomy, animal genetics, and any other applied animal science.

C. Mechanical Sciences--Included agricultural engineering, engineering, architecture, landscape architecture, and any other mechanical subject field.

D. Basic Sciences--Included chemistry, physics, botany, zoology (including economic zoology), physiology, genetics, geology, biology, anatomy, mathematics, statistics, biochemistry, and bacteriology.

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[20] Harlan Copeland, "Explanation of Terms Used in the Data Collection Form," ER&T-123, 6-61 (Washington: U. S. Department of Agriculture, Federal Extension Service, June 1961). (Mimeographed.)

E. Humanities--Included drama, music, art, geography (including agricultural geography), literature, religion, and philosophy.

F. Social Sciences--Included a summary of the following:

1. Education--Included elementary, secondary, adult, and all other education courses except those in extension education and agricultural education.
2. Extension Education--Included extension methods, field experiences for credit, 4-H programs, evaluation, program development, principles of extension teaching, etc.
3. Agricultural Education--Included introduction to agriculture, vocational education, vocational teaching, and supervised student teaching.
4. Psychology--Included human development, child development, social psychology, educational psychology, guidance, measurement and testing.
5. Economics--Included general, agricultural and farm management; marketing, land, consumer, agricultural, and family economics; investments; agricultural policy; and family and farm finance.

6. Sociology--Included rural, urban, and community organization; leadership; group processes; group dynamics; home, family, and human relations.
7. Communications--Included written, oral, and visual communications; journalism; interviewing; and photography.
8. Business and Public Administration--Included business law; accounting; office techniques and management; finance; organization; insurance; personnel management; administration; supervision; typewriting, city management; and city, community, and regional planning.
9. History, Political Science and Government--Included American and world civilization, civics, public affairs, parliamentary law, governmental processes, public opinion, politics, political behavior, and government organization.

F. Other--Included physical, recreation, and health education; military science and R.O.T.C.; library science; foreign languages; and anthropology.

In transferring the academic data from the college transcript to the data collection instrument, semester credit hours were converted to quarter hours because the majority of the subjects had earned their degrees at Virginia Polytechnic Institute which operates on the quarter system.

Therefore, the conversion to quarter credit hours was less laborious. In making the conversion, semester credit hours were multiplied by 1.5. The grades were transferred without alteration, and the V. P. I. quality credit system was used to determine grade point average. The V. P. I. quality credit system allows 3 quality credits for an A, 2 quality credits for a B, 1 quality credit for a C, and no quality credits for anything below a C. Therefore, all the academic data in this study are based on a 3.0 system.

Furthermore, in transferring the transcript data, all courses receiving a grade of A, B, C, D, or F were recorded. All of these grades were used in computing the total hours attempted, total hours failed, and the grade point averages which are used and reported in this study.

A Complete Listing of the Independent Variables. The preceding discussion describes how and why the independent variables considered in this study were selected. In Chapter I, these independent variables were referred to as employee characteristics. With 60 variables taken from the Strong Vocational Interest Blank, and 66 from the transcript analysis, quite a long list is the result. In the list of the variables below the tenure criterion variable, total years employed, and the performance criterion variable, performance rating index, are included. Actually, these two variables were used in constituting the three tenure groups and the three performance groups. Also, the service rating score is listed as an independent variable in order to compare its validity as a performance criterion to the more objective, clear-cut performance rating index.

The complete list of the independent variables used in the study analysis is as follows:

- Total Years Employed by the Virginia Cooperative Extension Service
- Performance Rating Index
- Service Rating Score
- Adaptability Test Score
- Age of Agent

Scales on Strong Vocational Interest Blank

- Group I
    - Artist
    - Psychologist
    - Architect
    - Physician
    - Psychiatrist
    - Osteopath
    - Dentist
    - Veterinarian
- Group II
    - Mathematician
    - Physicist
    - Chemist
    - Engineer
- Group III
    - Production Manager

Group IV

- Farmer
- Carpenter
- Forest Service Man
- Aviator
- Printer
- Math. Science Teacher
- Industrial Arts Teacher
- Vocational Agriculture Teacher
- Policeman
- Army Officer

Group V

- Y. M. C. A. Physical Director
- Personnel Manager
- Public Administrator
- Vocational Counselor
- Physical Therapist
- Social Worker
- Social Science Teacher
- Business Education Teacher
- School Superintendent
- Minister

Group VI

- Musician
- Music Teacher

Group VII

- C. P. A. Owner

Group VIII

- Senior C. P. A.
- Accountant
- Office Worker
- Credit Manager
- Purchasing Agent
- Banker
- Pharmacist
- Mortician

Group IX

- Sales Manager
- Real Estate Manager
- Life Insurance Salesman

Group X

- Advertising Man
- Lawyer
- Author-Journalist

Group XI

- President Manufacturing Concern

Group I

Group II

Group V

Group VIII

Group IX

Specialization Level

Interest Maturity

Occupational Level

Masculinity-Femininity

8

Academic Accomplishments: For Undergraduate Curriculum (The same variables also apply for Beyond the Undergraduate Curriculum)

Hours in Plant Sciences

Grade Point Average in Plant Sciences

Hours in Animal Sciences

Grade Point Average in Animal Sciences

Hours in Mechanical Sciences

Grade Point Average in Mechanical Sciences

Hours in Basic Sciences

Grade Point Average in Basic Sciences

Hours in Humanities

Grade Point Average in Humanities

Hours in Social Sciences

Grade Point Average in Social Sciences

Hours in Education

Grade Point Average in Education

Hours in Extension Education

Grade Point Average in Extension Education

Hours in Agricultural Education

Grade Point Average in Agricultural Education

Hours in Psychology

Grade Point Average in Psychology

Hours in Economics

Grade Point Average in Economics

Hours in Sociology

Grade Point Average in Sociology

Hours in Communications

Grade Point Average in Communications

Hours in Business and Public Administration

Grade Point Average in Business and Public Administration

Hours in History, Political Science, and Government

Grade Point Average in History, Political Science, and Government

Total Hours Attempted

Total Hours Failed

Overall Grade Point Average

A total of 131 variables were involved in the study.

Procedure for Collecting the Data

The collection of the data consisted of three basic steps: (1) collecting the general information, (2) administering the two psychological instruments, and (3) abstracting the college transcript data. The procedure used in each step was as follows.

Collecting General Information. Certain information was needed which was most readily available from the personnel records of the Virginia Cooperative Extension Service. Information obtained from this source included the list of the employees systematically selected for the study, date of employment, age, and service rating score.

The performance rating index was derived from the use of the Personnel Comparison System. The rating cards were prepared by the author and sent with instructions to the district agent of each of the six extension districts in Virginia. The district agents performed the ratings and returned the cards immediately.

Administering the Two Psychological Instruments. The Adaptability Test and the Strong Vocational Interest Blank were administered to the agents at the six district meetings in March and April of 1966. The State Leader for Training administered the instruments at four of the meetings, the author at the other two meetings.

The author scored the Adaptability Test, using the scoring key provided in the examiner's manual. The answer sheets for the SVIB were machine scored by the National Computer Systems of Minneapolis, Minnesota. The National Computer Systems returned two Report Forms for each subject who took the SVIB. One was sent to the agent and the other kept for use in the study.

Abstracting the College Transcript Data. Forms used by the Federal Extension Service in their study of the formal training of extension agents were modified and reproduced for use in this study.

The policy followed was to record credit hours for all grades A, B, C, D, and F. Also, a standard procedure was used of including the credit hours for courses which were failed in computing all grade point averages.

Most of the subjects in this study had received their undergraduate training at Virginia Polytechnic Institute.

These transcripts were made available by the Registrar of V. P. I. through the State Leader for Training.

All of the transcripts for those agents who had received their training at institutions other than V. P. I. were not made available. This reduced the total numbers in each of the groups as shown in the table. This lack of information was accounted for in the final analysis of the data.

It was found that three of the agents in the study do not have college degrees. All three were in the long tenure group and one each in the performance groups.

Assembling the Data

The decision was made early in the study to obtain and use data which were as specific, objective and clear-cut as feasible. The raw data were all in numerical form.

Total years employed by the Virginia Cooperative Extension Service was used for tenure; the performance rating index and the service rating score for performance; actual age of the agent; raw score on the Adaptability Test for adaptability, or more specifically, mental ability; standard scores on the Strong Vocational Interest Blank for vocational interests; and actual hours attempted and grade points earned with the resulting grade point average for academic accomplishments.

These various numerical values were transferred to IBM data cards for the analysis.

TABLE I

NUMBER OF COLLEGE TRANSCRIPTS LACKING AND RESULTING SIZE OF EACH GROUP

Group	Number transcripts lacking	Resulting group size
Short tenure	2	22
Medium tenure	2	27
Long tenure	8	16
Low performance	5	19
Medium performance	5	24
High performance	2	22

Treatment of the Data

With modern methods of data processing, there is no lack of means for analyzing the kind of data used in this study. But it does become necessary to make a decision on the most appropriate method to use.

After counseling with the major advisor for this study and the academic consultant for educational research projects at the University of Maryland Computer Science Center, it was decided that the major analyses of the data collected for this study would be a simple correlation program and an analysis of variance.

The General Correlation Program for Unequal N by Dr. Nancy S. Anderson of the University of Maryland was chosen as the specific program to use for the correlation analysis.

This program computes a Pearson-product moment correlation coefficient for m variables ($m \leq 50$) when the number of observations are unequal for different pairs of variables. Means and standard deviations are also computed. The part of this program which made it particularly appropriate for the analysis of the data for this study is its ability to handle missing data for any variable as blanks.[21] With such a variety of data available on the formal training analysis, this type program was needed.

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[21] Nancy S. Anderson, "General Correlation Program for Unequal N," UOM 0009, UOM Program Handbook (College Park: University of Maryland Computer Science Center, 1954), p. 19.

Another advantage of this program is that it uses the raw score formula for computing Pearson r. Each r is calculated by using the sums, sums of squares, sums of cross products, and N's for the maximum number of observations for each pair of variables chosen.[22]

After the data were analyzed by the IBM 7094 computer according to the program described, the means, standard deviations and correlation coefficients were tabulated for all variables within each group. The means and standard deviations reported are those for each variable within that particular group. The correlation coefficient reported for each variable is the result of correlating that variable with the criterion variable for that group.

The .05 and .01 levels of significance were used. The table of correlation coefficients in Guilford's Fundamental Statistics in Psychology and Education was used for obtaining significant values.[23]

Also, a computerized program for analysis of variance was used for all the continuous variables. Those variables which could not be analyzed by this program were primarily the grade point averages for the various categories of the formal training analysis.

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[22] Ibid., p. 21.

[23] J. P. Guilford, Fundamental Statistics in Psychology and Education (New York: McGraw-Hill, 1956), pp. 538-539.

The analysis of variance was used in this case to determine if there were any significant differences in the mean scores of the groups with regard to each of the variables. An F Ratio was obtained and significance was determined by the use of a table of points for the distribution of F found in Guilford's book.[24] Both the .05 and .01 levels of significance were used for this analysis.

Included in this analysis of variance program was a chi square test. In this case, the chi square was used to test the homogeneity of variance within the groups for each of the continuous variables. A chi square value was obtained and significance was determined by using the chi square table in Guilford.[25] Again, both the .05 and .01 levels of significance were used.

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[24] _Ibid_., pp. 541-542.

[25] _Ibid_., p. 540.

CHAPTER IV

FINDINGS WITHIN THE HYPOTHETICAL FRAMEWORK

Certain hypotheses and objectives have served as guidelines in setting up the framework for conducting this study. They have also been followed in analyzing the data, and will be used here in reporting the findings.

Findings Regarding Tenure

One of the major areas of interest in this investigation was that of the comparison of the characteristics of those employees with different lengths of tenure, and the relationship of these characteristics to the total years which the employee has been employed by the Virginia Cooperative Extension Service.

The hypothesis regarding tenure made provision for studying it from two aspects. The findings in each will now be presented and discussed.

Vocational Interests. It was hypothesized that those employees having longer tenure would also have vocational interests more nearly like those of successful men in the following occupations, as shown by the Strong Vocational Interest Blank: Y. M. C. A. Physical Director, Personnel Manager, Public Administrator, Vocational Counselor, Physical

Therapist, Social Worker, Social Science Teacher, Business Education Teacher, School Superintendent, and Minister.

As is shown in Table II, there was a significant difference in the mean standard score for only two of the ten occupational scales considered in this hypothesis. They were Public Administrator and Physical Therapist. However, this is a negative difference when considered in terms of the hypotheses because the Short Tenure Group has a higher mean score than the Long Tenure Group. This same result was found with many of the SVIB scales.

Table III shows that there were no significant differences in the variances of the three groups on these ten SVIB scales. In this situation, this is the preferred result. However, an examination of the standard deviations will reveal a rather consistently great deviation from the means which indicates a uniform heterogeneity throughout the sample.

The Business Education Teacher scale was the only one that a significant correlation to the criterion, total years employed. Again, however, the significance was within the Short Tenure Group and the relationship decreased with increasing tenure. This result can be seen in Table IV.

Academic Accomplishments. Another hypothesis regarding tenure was that those employees having longer tenure would also have a greater amount of formal academic training in the social sciences, and especially in education, extension education, agricultural education, psychology, sociology, and communications.

TABLE II

MEAN STANDARD SCORES AND F RATIOS FOR SELECTED SCALES OF THE STRONG VOCATIONAL INTEREST BLANK, BY TENURE GROUPS

SVIB Scale	Group tenure			F Ratio
	Short	Medium	Long	
Y.M.C.A. Physical Director	35.42	31.17	30.42	1.3018
Personnel Manager	33.71	29.72	29.00	0.9718
Public Administrator	45.58	41.48	37.42	4.0964*
Vocational Counselor	39.29	36.45	37.46	0.4548
Physical Therapist	40.75	35.66	31.29	4.0956*
Social Worker	32.29	27.17	30.42	1.1637
Social Science Teacher	35.96	34.45	36.88	0.2665
Business Education Teacher	36.88	34.90	33.63	0.4059
School Superintendent	28.08	28.55	31.58	0.8052
Minister	22.54	20.45	25.75	1.3311
Total Group of Scales	42.42	40.41	43.04	0.4755

*Statistically significant at the .05 level

TABLE III

STANDARD DEVIATIONS AND CHI SQUARE VALUES FOR SELECTED SCALES OF THE STRONG VOCATIONAL INTEREST BLANK, BY TENURE GROUPS

SVIB Scale	Group tenure			Chi square value
	Short	Medium	Long	
Y.M.C.A. Physical Director	12.73	10.11	12.34	1.5455
Personnel Manager	14.78	11.09	12.31	2.1142
Public Administrator	11.45	8.16	10.10	2.8858
Vocational Counselor	12.12	9.15	11.46	2.1675
Physical Therapist	12.74	10.60	11.11	0.9064
Social Worker	13.77	10.15	13.43	2.7667
Social Science Teacher	12.37	10.42	14.09	2.2692
Business Education Teacher	14.64	10.04	13.19	3.6828
School Superintendent	10.20	9.73	11.56	0.7896
Minister	12.95	10.12	12.47	1.7446
Total Group of Scales	10.94	8.65	11.53	2.2874

TABLE IV

CORRELATION COEFFICIENTS OF STANDARD SCORES ON SELECTED SCALES OF THE STRONG VOCATIONAL INTEREST BLANK AND TOTAL YEARS EMPLOYED, BY TENURE GROUPS

SVIB Scale	Group tenure		
	Short	Medium	Long
Y.M.C.A. Physical Director	.25	.09	.08
Personnel Manager	.13	.21	-.16
Public Administrator	.00	.33	-.17
Vocational Counselor	.30	.20	-.16
Physical Therapist	.12	.20	-.22
Social Worker	.02	.29	-.23
Social Science Teacher	.35	.05	-.01
Business Education Teacher	.42*	.20	-.18
School Superintendent	.20	.15	.02
Minister	.17	.10	-.03
Total Group Scales	.27	.16	.02

*Statistically significant at the .05 level

The only significant finding in this area was opposite to that which was hypothesized. There was a significant difference in the amount of formal academic training in the combined social sciences for the undergraduate curriculum (Table V). However, the Short and Medium Tenure Groups had more training in this area than did the Long Tenure Group. Again, the deviation from the means in the combined social sciences in the undergraduate curriculum, as shown by Table VI, were significant, and the greatest deviation was within the Long Tenure Group.

Other significant findings in the undergraduate curriculum show a great variation in the amount of training which short tenure employees have had in agricultural education. There is a much greater variation in the amount of training in communications among long tenure employees than among short tenure employees. This may reflect a trend among colleges of agriculture to require more hours in the social sciences, and especially in communications, in recent years.

As shown in Tables VII and VIII, there were no significant differences in the amount of training in the selected areas beyond the undergraduate curriculum. However, the deviation from the mean number of credit hours within the three tenure groups was very significant (.01 level) in all of the selected areas.

There were no significant relationships found between these areas of study and the tenure criterion, total years

TABLE V

MEAN NUMBER OF ACADEMIC CREDIT HOURS AND F RATIOS IN SELECTED AREAS OF UNDERGRADUATE CURRICULUM, BY TENURE GROUPS

Area of study	Group tenure			F Ratio
	Short	Medium	Long	
Total Social Sciences	52.95	57.07	38.27	3.9281*
Education	0.71	0.67	0.40	0.2054
Extension Education	0.86	1.22	0.67	0.5850
Agricultural Education	5.71	4.96	1.73	0.9528
Psychology	3.86	2.81	2.80	0.7907
Sociology	4.52	4.41	2.67	1.4916
Communications	17.14	16.59	13.20	2.6637

*Statistically significant at the .05 level

TABLE VI

STANDARD DEVIATIONS AND CHI SQUARE VALUES IN SELECTED AREAS OF THE UNDERGRADUATE CURRICULUM, BY TENURE GROUPS

Area of study	Group tenure			Chi square value
	Short	Medium	Long	
Total Social Sciences	13.30	22.59	26.68	8.2741*
Education	1.31	1.69	1.55	1.3764
Extension Education	1.68	1.85	1.40	1.2986
Agricultural Education	10.37	9.72	3.37	17.2840**
Psychology	3.69	2.90	2.57	2.4204
Sociology	3.68	3.34	3.58	0.2206
Communications	3.80	4.27	8.35	13.3823**

*Statistically significant at the .05 level
**Statistically significant at the .01 level

TABLE VII

MEAN NUMBER OF ACADEMIC CREDIT HOURS AND F RATIOS FOR SELECTED AREAS BEYOND THE UNDERGRADUATE CURRICULUM, BY TENURE GROUPS

Area of study	Group tenure			F
	Short	Medium	Long	Ratio
Total Social Sciences	4.71	5.74	1.25	1.3596
Education	0.67	0.56	0.00	0.4492
Extension Education	1.10	1.11	0.00	1.8256
Agricultural Education	0.57	2.07	0.19	1.1079
Psychology	0.29	0.00	0.00	2.1571
Sociology	0.71	0.00	0.00	2.0657
Communications	0.29	0.07	0.19	0.5703

TABLE VIII

STANDARD DEVIATIONS AND CHI SQUARE VALUES FOR SELECTED AREAS BEYOND THE UNDERGRADUATE CURRICULUM, BY TENURE GROUPS

Area of study	Group tenure			Chi square value
	Short	Medium	Long	
Total Social Sciences	11.16	8.93	2.70	24.0274*
Education	2.13	2.89	0.00	181.8081*
Extension Education	2.62	2.03	0.00	177.9893*
Agricultural Education	2.04	6.63	0.75	63.7394*
Psychology	0.90	0.00	0.00	17727.0*
Sociology	2.31	0.00	0.00	17727.0*
Communications	0.90	0.38	0.75	15.7671*

*Statistically significant at the .01 level

employed, for either of the tenure groups with regard to the undergraduate curriculum. See Table IX. However, as shown in Table X, the total social sciences and the communications areas of study had a significant positive relationship to total years employed within the Short Tenure Group for all formal training beyond the undergraduate curriculum.

Findings Regarding Performance

Another of the major areas of interest in this investigation was that of the characteristics of those employees who were considered by their supervisors to be most effective as compared to those considered to be least effective. The hypothesis regarding performance made provision for studying it from four aspects. The findings in each will now be presented and discussed.

Adaptability. It was hypothesized that those employees having higher performance ratings would also have greater adaptability as shown by the Adaptability Test.

As shown in Table XI, the high performing agents did score slightly more than three points higher on the Adaptability Test than did the low performing agents. However, this was not a statistically significant difference. Likewise, the variance and correlation were not significant.

Vocational Interests. It was also hypothesized that those employees having higher performance ratings would also have vocational interests more like those of successful men in the following occupations, as shown by the Strong

TABLE IX

CORRELATION COEFFICIENTS OF ACADEMIC CREDIT HOURS IN SELECTED AREAS OF THE UNDERGRADUATE CURRICULUM AND TOTAL YEARS EMPLOYED, BY TENURE GROUPS

Area of study	Group tenure		
	Short	Medium	Long
Total Social Sciences	-.19	.00	.33
Education	.06	-.17	.48
Extension Education	.29	-.24	.08
Agricultural Education	.21	-.09	.47
Psychology	-.33	.03	.26
Sociology	-.12	.13	.50
Communications	.34	.07	.15

TABLE X

CORRELATION COEFFICIENTS OF ACADEMIC CREDIT HOURS IN SELECTED AREAS BEYOND THE UNDERGRADUATE CURRICULUM AND TOTAL YEARS EMPLOYED, BY TENURE GROUPS

Area of study	Group tenure		
	Short	Medium	Long
Total Social Sciences	.45*	.12	-.35
Education	.42	.18	.00
Extension Education	.38	.12	.00
Agricultural Education	-.03	.19	-.01
Psychology	.29	.00	.00
Sociology	.41	.00	.00
Communications	.45*	.01	-.47

*Statistically significant at the .05 level

TABLE XI

MEAN, F RATIO; STANDARD DEVIATION, CHI SQUARE VALUE; AND CORRELATION COEFFICIENT FOR ADAPTABILITY, BY PERFORMANCE GROUPS

	Performance Group			
	Low	Medium	High	
Mean Adaptability Score	18.54	19.59	21.79	
F Ratio				1.6967
Standard Deviation	7.00	6.58	4.92	
Chi Square Value				3.0156
Correlation Coefficient	.12	.08	.04	

Vocational Interest Blank: Y. M. C. A. Physical Director, Personnel Manager, Public Administrator, Vocational Counselor, Physical Therapist, Social Worker, Social Science Teacher, Business Education Teacher, School Superintendent, and Minister.

There were no significant differences in the means or variances on the SVIB scales by performance groups considered in this section, as shown in Tables XII and XIII.

However, as shown in Table XIV, there was a significant relationship between the standard score on some SVIB scales and performance. The Public Administrator, Vocational Counselor and Business Education Teacher scales are highly related to performance within the Low Performance Group.

There was a high negative correlation between the standard score on the Minister scale and performance within the Medium Performance Group.

Grade Point Average. In further search of employee characteristics related to performance, it was hypothesized that those employees having higher performance ratings would also have higher overall grade point averages for their undergraduate curriculum.

There were no significant differences or relationships between grade point average and performance, as is shown in Table XV.

Academic Accomplishments. Finally with regard to performance, it was hypothesized that those employees having higher performance ratings would also have a greater amount

TABLE XII

MEAN STANDARD SCORES AND F RATIOS FOR SELECTED SCALES OF THE STRONG VOCATIONAL INTEREST BLANK, BY PERFORMANCE GROUPS

SVIB Scale	Performance group			F Ratio
	Low	Medium	High	
Y.M.C.A. Physical Director	30.29	33.28	33.00	0.4883
Personnel Manager	28.67	30.90	32.63	0.5793
Public Administrator	40.00	41.07	43.50	0.7302
Vocational Counselor	35.79	39.14	37.71	0.6259
Physical Therapist	34.50	36.97	35.96	0.2763
Social Worker	28.00	30.62	30.54	0.3511
Social Science Teacher	33.54	37.69	35.38	0.7723
Business Education Teacher	32.33	37.34	35.21	1.0568
School Superintendent	27.58	30.97	29.17	0.6878
Minister	21.79	23.90	22.33	0.2243
Total Group of Scales	40.42	43.10	41.79	0.4440

TABLE XIII

STANDARD DEVIATIONS AND CHI SQUARE VALUES FOR SELECTED SCALES OF THE STRONG VOCATIONAL INTEREST BLANK, BY PERFORMANCE GROUPS

SVIB Scale	Performance group			Chi square value
	Low	Medium	High	
Y.M.C.A. Physical Director	11.32	11.62	12.47	0.2296
Personnel Manager	12.83	11.36	14.27	1.3063
Public Administrator	10.93	9.80	10.29	0.2929
Vocational Counselor	9.97	9.60	12.91	2.5943
Physical Therapist	11.39	12.50	12.09	0.2146
Social Worker	12.05	11.36	14.27	1.4006
Social Science Teacher	10.97	10.43	14.97	3.8735
Business Education Teacher	12.33	12.31	12.89	0.0656
School Superintendent	10.36	9.25	11.94	1.6432
Minister	12.06	11.27	12.69	0.3560
Total Group of Scales	10.30	9.12	11.69	1.5323

TABLE XIV

CORRELATION COEFFICIENTS OF STANDARD SCORES ON SELECTED SCALES OF THE STRONG VOCATIONAL INTEREST BLANK AND PERFORMANCE RATING INDEX, BY PERFORMANCE GROUPS

SVIB Scale	Performance group		
	Low	Medium	High
Y.M.C.A. Physical Director	-.00	-.26	-.12
Personnel Manager	.33	-.23	-.00
Public Administrator	.40*	-.04	-.07
Vocational Counselor	.41*	-.20	-.12
Physical Therapist	.31	-.16	-.20
Social Worker	.35	-.35	-.06
Social Science Teacher	.37	-.25	-.02
Business Education Teacher	.47*	-.17	-.17
School Superintendent	.26	-.26	.10
Minister	.08	-.44*	.03
Total Group of Scales	.21	-.36	-.03

*Statistically significant at the .05 level

TABLE XV

MEAN, F RATIO; STANDARD DEVIATION, CHI SQUARE VALUE; AND CORRELATION COEFFICIENT FOR UNDERGRADUATE GRADE POINT AVERAGE, BY PERFORMANCE GROUPS

	Performance group			
	Low	Medium	High	
Mean Grade Point Average	1.58	1.57	1.48	
F Ratio				0.3332
Standard Deviation	0.50	0.48	0.33	
Chi Square Value				3.2961
Correlation Coefficient	-.20	.13	.02	

of academic credit hours in the social sciences, and especially in education, extension education, agricultural education, psychology, sociology, and communications.

Tables XVI and XVIII show that there were no significant differences between the performance groups in the amount of academic training in the selected areas in either the undergraduate curriculum or the program beyond the undergraduate curriculum.

A very significant difference in the deviation from the means, as shown in Tables XVII and XIX, was found in the area of education in both the undergraduate curriculum and beyond the undergraduate curriculum. In both cases, the deviation was greater within the Low Performance Groups. The same significance was found for the area of agricultural education beyond the undergraduate curriculum.

A tremendously great difference was found in the deviations for the areas of psychology, sociology and communications beyond the undergraduate curriculum. However, the Low Performance Group had not had any training in these areas, resulting in absolutely no deviation to compare with that of the other two groups.

The correlation coefficients in Tables XX and XXI show that no significant relationships were found between the number of academic credit hours in the selected areas of study and the performance rating index, for either the undergraduate curriculum or all formal training beyond the undergraduate curriculum.

TABLE XVI

MEAN NUMBER OF ACADEMIC CREDIT HOURS AND F RATIOS IN SELECTED AREAS OF UNDERGRADUATE CURRICULUM, BY PERFORMANCE GROUPS

Area of study	Performance group			F Ratio
	Low	Medium	High	
Total Social Sciences	52.06	48.26	53.64	0.3432
Education	1.33	0.39	0.27	3.0072
Extension Education	0.89	1.13	0.86	0.1644
Agricultural Education	8.17	3.09	2.82	2.2985
Psychology	4.00	2.96	2.68	0.9668
Sociology	4.28	4.52	3.32	0.7031
Communications	15.94	16.35	15.59	0.1026

TABLE XVII

STANDARD DEVIATIONS AND CHI SQUARE VALUES IN SELECTED AREAS OF THE UNDERGRADUATE CURRICULUM, BY PERFORMANCE GROUPS

Area of study	Performance group			Chi square value
	Low	Medium	High	
Total Social Sciences	18.02	20.04	27.23	3.6580
Education	2.30	1.03	0.88	21.3177*
Extension Education	1.81	1.84	1.46	1.3108
Agricultural Education	11.19	6.80	8.23	4.8591
Psychology	2.93	3.57	2.70	1.7859
Sociology	3.10	3.96	3.46	1.1471
Communications	5.40	4.97	6.36	1.3379

*Statistically significant at the .01 level

TABLE XVIII

MEAN NUMBER OF ACADEMIC CREDIT HOURS AND F RATIOS IN SELECTED AREAS BEYOND THE UNDERGRADUATE CURRICULUM, BY PERFORMANCE GROUPS

Area of study	Performance group			F Ratio
	Low	Medium	High	
Total Social Sciences	3.78	4.54	4.41	0.0410
Education	0.83	0.33	0.27	0.3624
Extension Education	1.00	0.71	0.82	0.1037
Agricultural Education	1.44	1.62	0.27	0.5787
Psychology	0.00	0.12	0.14	0.3926
Sociology	0.00	0.37	0.27	0.4070
Communications	0.00	0.33	0.14	1.2945

TABLE XIX

STANDARD DEVIATIONS AND CHI SQUARE VALUES IN SELECTED AREAS BEYOND THE UNDERGRADUATE CURRICULUM, BY PERFORMANCE GROUPS

Area of study	Performance group			Chi square value
	Low	Medium	High	
Total Social Sciences	9.05	8.82	9.00	0.0148
Education	3.54	1.63	1.28	22.4772*
Extension Education	2.06	2.01	2.11	0.0479
Agricultural Education	4.34	6.32	0.88	53.7839*
Psychology	0.00	0.61	0.64	17727.0*
Sociology	0.00	1.84	1.28	17727.0*
Communications	0.00	0.92	0.64	17727.0*

*Statistically significant at the .01 level

TABLE XX

CORRELATION COEFFICIENTS OF ACADEMIC CREDIT HOURS IN SELECTED AREAS OF THE UNDERGRADUATE CURRICULUM AND PERFORMANCE RATING INDEX, BY PERFORMANCE GROUPS

Area of study	Performance group		
	Low	Medium	High
Total Social Sciences	.05	.01	-.35
Education	-.45	-.27	-.19
Extension Education	.07	-.30	-.10
Agricultural Education	-.22	-.18	-.21
Psychology	.09	-.24	.11
Sociology	.14	.32	-.27
Communications	.12	.04	-.23

TABLE XXI

CORRELATION COEFFICIENTS OF ACADEMIC CREDIT HOURS IN SELECTED AREAS BEYOND THE UNDERGRADUATE CURRICULUM AND PERFORMANCE RATING INDEX, BY PERFORMANCE GROUPS

Area of study	Performance group		
	Low	Medium	High
Total Social Sciences	-.15	-.09	-.25
Education	-.04	-.24	-.22
Extension Education	-.31	-.21	-.15
Agricultural Education	-.11	.17	-.07
Psychology	.00	-.18	-.22
Sociology	.00	-.24	-.22
Communications	.00	-.37	-.22

Additional Findings Regarding Vocational Interests

The final research hypothesis stated that those employees having lower performance ratings and shorter tenure would also have vocational interests more like those of successful men in the following occupations, according to the Strong Vocational Interest Blank: Farmer, Carpenter, Forest Service Man, Aviator, Printer, Math. Science Teacher, Industrial Arts Teacher, Vocational Agriculture Teacher, Policeman, and Army Officer.

The findings with regard to this hypothesis will be presented and discussed separately, first by tenure and then by performance.

Tenure. It was found that those employees with shorter tenure did have vocational interests significantly more like successful men in the occupations of Farmer, Vocational Agriculture Teacher, Policeman, and Army Officer. And, their vocational interests were very significantly (.01) more like those of successful men in the occupations of Forest Service Man and Aviator. See Table XXII.

Furthermore, as shown in Table XXIII, there were no significant differences in the variances of the groups on any of the SVIB scales considered in this hypothesis. This tends to strengthen the significant differences in the means reported in Table XXII.

When the standard scores on these SVIB scales were correlated with the tenure criterion, total years employed,

TABLE XXII

MEAN STANDARD SCORES AND F RATIOS FOR SELECTED SCALES OF THE STRONG VOCATIONAL INTEREST BLANK, BY TENURE GROUPS

SVIB Scale	Group tenure			F Ratio
	Short	Medium	Long	
Farmer	42.58	25.48	37.87	3.8065*
Carpenter	26.21	25.48	20.96	1.3065
Forest Service Man	38.58	37.41	27.33	7.6090**
Aviator	35.87	30.86	21.79	11.6000**
Printer	31.25	28.48	27.29	1.2477
Math. Science Teacher	38.75	36.90	33.54	1.7370
Industrial Arts Teacher	29.50	28.93	21.54	2.4472
Vocational Agriculture Teacher	41.54	45.69	36.92	3.3496*
Policeman	35.79	33.45	28.25	4.7178*
Army Officer	34.08	29.34	19.87	8.8534*

*Statistically significant at the .05 level
**Statistically significant at the .01 level

TABLE XXIII

STANDARD DEVIATIONS AND CHI SQUARE VALUES FOR SELECTED SCALES OF THE STRONG VOCATIONAL INTEREST BLANK, BY TENURE GROUPS

SVIB Scale	Group tenure			Chi square value
	Short	Medium	Long	
Farmer	10.19	9.81	10.11	0.0396
Carpenter	12.99	11.86	12.15	0.2172
Forest Service Man	10.27	10.70	12.33	0.8720
Aviator	9.84	9.23	11.84	1.6717
Printer	8.67	8.77	9.38	0.1665
Math. Science Teacher	9.76	11.20	7.93	2.8491
Industrial Arts Teacher	15.86	14.04	12.09	1.6398
Vocational Agriculture Teacher	11.81	11.71	13.38	0.5404
Policeman	10.41	7.52	8.25	2.8216
Army Officer	14.18	11.04	10.44	2.5688

no significant relationships were found. Table XXIV has this information.

Performance. No significant differences were found in the means or standard deviations of the standard scores on the vocational interest scales considered here, with regard to performance. This is shown in Tables XXV and XXVI.

The Vocational Agriculture Teacher scale was found to have a significant positive relationship to the performance rating index for the Low Performance Group, while the Policeman scale had a significant negative relationship to the performance rating index for the High Performance Group. This information can be found in Table XXVII.

Testing the Null Hypothesis

The null hypothesis which was tested throughout this study was stated as: "There will be no statistically significant relationship between tenure and performance ratings and: (a) adaptability, (b) vocational interests, (c) academic credit hours, and (d) grade point average for the undergraduate curriculum."

When investigated within the framework of specific research hypotheses, decisions regarding the null were as follows:

The null hypothesis regarding adaptability was sustained.

Twenty occupations for which there are scales on the Strong Vocational Interest Blank were considered. One scale,

TABLE XXIV

CORRELATION COEFFICIENTS OF STANDARD SCORES ON SELECTED SCALES OF THE STRONG VOCATIONAL INTEREST BLANK AND TOTAL YEARS EMPLOYED, BY TENURE GROUPS

SVIB Scale	Group tenure		
	Short	Medium	Long
Farmer	.08	-.28	.10
Carpenter	.16	-.21	-.01
Forest Service Man	.15	-.11	-.01
Aviator	-.24	-.04	-.23
Printer	.12	-.08	-.46
Math. Science Teacher	.17	-.07	-.24
Industrial Arts Teacher	.16	-.08	-.06
Vocational Agriculture Teacher	.39	-.10	.19
Policeman	.29	.09	.02
Army Officer	.00	.29	-.13

TABLE XXV

MEAN STANDARD SCORES AND F RATIOS FOR SELECTED SCALES OF THE STRONG VOCATIONAL INTEREST BLANK, BY PERFORMANCE GROUPS

SVIB Scale	Performance group			F Ratio
	Low	Medium	High	
Farmer	42.58	41.69	42.46	0.0573
Carpenter	26.62	23.83	22.54	0.6829
Forest Service Man	33.29	33.86	36.92	0.6345
Aviator	30.08	28.38	30.58	0.2609
Printer	29.46	30.24	26.96	0.9298
Math. Science Teacher	36.62	38.14	34.17	1.0597
Industrial Arts Teacher	28.75	27.14	24.46	0.5429
Vocational Agriculture Teacher	41.50	40.76	42.92	0.1895
Policeman	32.21	32.38	33.12	0.0675
Army Officer	27.17	27.14	29.46	0.2507

TABLE XXVI

STANDARD DEVIATIONS AND CHI SQUARE VALUES FOR SELECTED SCALES OF THE STRONG VOCATIONAL INTEREST BLANK, BY PERFORMANCE GROUPS

SVIB Scale	Performance group			Chi square value
	Low	Medium	High	
Farmer	10.21	10.70	10.60	0.0579
Carpenter	12.08	11.52	13.72	0.8063
Forest Service Man	11.64	12.74	11.72	0.2646
Aviator	13.56	11.71	9.67	2.5368
Printer	8.21	8.36	10.32	1.5752
Math. Science Teacher	8.86	10.31	10.42	0.7319
Industrial Arts Teacher	13.77	15.35	13.92	0.3745
Vocational Agriculture Teacher	12.10	13.99	11.92	0.8209
Policeman	8.52	10.50	8.33	1.7114
Army Officer	12.77	14.49	12.07	0.8978

TABLE XXVII

CORRELATION COEFFICIENTS OF STANDARD SCORES ON SELECTED SCALES OF THE STRONG VOCATIONAL INTEREST BLANK AND PERFORMANCE RATING INDEX, BY PERFORMANCE GROUPS

SVIB Scale	Performance group		
	Low	Medium	High
Farmer	.07	.12	-.14
Carpenter	-.25	.04	-.27
Forest Service Man	.14	.07	-.11
Aviator	.11	.16	-.15
Printer	.27	-.08	-.18
Math. Science Teacher	.22	-.05	-.10
Industrial Arts Teacher	-.05	-.04	-.22
Vocational Agriculture Teacher	.47*	.02	-.17
Policeman	-.06	.09	-.45*
Army Officer	.18	.05	-.10

*Statistically significant at the .05 level

Business Education Teacher, had a significant positive relationship to tenure within the Short Tenure Group. The Public Administrator, Vocational Counselor, Business Education Teacher, and Vocational Agriculture Teacher scales had a significant positive relationship to performance within the Low Performance Group. The Minister scale had a significant negative relationship to performance within the Medium Performance Group, and the Policeman scale had a significant negative relationship to performance within the High Performance Group. On the basis of these findings, the null hypothesis regarding vocational interests was rejected for the six SVIB scales above, and sustained for the remainder of the scales.

Of the seven areas of academic study considered, two had significant positive relationships to tenure within the Short Tenure Group. They were Total Social Sciences and Communications. The null hypothesis regarding academic credit hours was rejected for these two areas of academic study and sustained for the remainder of the areas of academic study.

The null hypothesis regarding grade point average for the undergraduate curriculum was sustained.

CHAPTER V

FINDINGS OUTSIDE THE HYPOTHETICAL FRAMEWORK

As the present study was designed, hypotheses were made to study the relationship of 36 independent variables to two dependent, or criterion, variables. In the preceding chapter, the relationships of these variables were presented.

In gathering data for the analysis in the preceding chapter, other data were generated. In fact, enough additional data were generated that 92 more independent variables were identified. Also, the Service Rating Score, originally intended for use as a criterion variable, was left in the analysis and treated as an independent variable.

By having such a vast amount of data, certain observations were made which are pertinent to this investigation and which help to more completely describe the population being studied. Furthermore, the 93 additional variables were analyzed with the same statistical treatments as were those within the hypothetical framework, except for several regarding the academic records. Many of these variables had such irregular or small N's that statistical tests would have been laborious and, in some cases, meaningless.

In this chapter, with the freedom allowed without a hypothetical framework, certain findings which were significant with proper statistical treatment, and other findings pertinent to this investigation, will be presented.

Norms for the Adaptability Test

Even though the Adaptability Test score was not found to have a significant relationship to tenure and performance, it is interesting to compare it with norms established for the test.

The authors of the AT provide norms which have been established for the test with twelve populations.[1] Bluhm used this instrument in his study with Indiana County Extension Administrators and reported a mean score of 22.4.[2] A comparison of these thirteen groups and the mean score of the Virginia Extension Agents-Agriculture is shown in Table XXVIII.

The Virginia group of agents scored relatively lower than did the Indiana agents. No attempt was made to determine a statistical difference.

Scales of the Strong Vocational Interest Blank on Which Virginia Extension Agents-Agriculture Had Significant Scores

Chance scores have been determined for most of the scales on the Strong Vocational Interest Blank. These are

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[1] Joseph Tiffin and C. H. Lawshe, Examiner Manual for the Adaptability Test (Chicago: Science Research Associates, 1954).

[2] Wilbur R. Bluhm, "An Examination of Three Tests for the Selection of County Extension Personnel" (unpublished Master's thesis, Purdue University, Lafayette, Indiana, 1964), p. 27.

TABLE XXVIII

NORMS FOR THE ADAPTABILITY TEST COMPARED WITH SCORES OF INDIANA COUNTY EXTENSION ADMINISTRATORS AND VIRGINIA EXTENSION AGENTS-AGRICULTURE ON THIS TEST: MEANS AND STANDARD DEVIATIONS

Group	Number cases	Mean	Standard deviation
Female Employees and Hourly Applicants	6000	9.9	5.82
Female Applicants	612	10.5	5.44
Male Employees and Hourly Applicants	4012	11.8	6.59
Male Employees for Factory Work	899	14.8	6.61
Clerical Employees	123	16.7	5.44
Clerical Applicants	2944	18.3	5.70
General Foremen, Assistant General Foremen, Foremen	186	15.7	5.71
Works Foremen	333	16.8	6.62
Foremen and Supervisory Personnel	660	19.4	6.59
Time Study Personnel	32	21.4	4.72
Purdue Seniors	43	26.0	4.39
College Recruits	48	24.5	3.75
Indiana County Extension Administrators	79	22.4	4.41
Virginia Extension Agents-Agriculture	77	19.9	6.27

shown on the Report Form by shaded areas. The author of the instrument considered any score which was four or more scores above or below the extremes of the chance area as being significant.[3] Table XXIX shows on which of the scales Virginia Extension Agents-Agriculture had significant scores.

On the basis of these results, the population in question could be described as not having the interests of men successful as Artists and Author-Journalists. Virginia Extension Agents-Agriculture have vocational interests very much like men who were successful Farmers, Forest Service Men, Y. M. C. A. Physical Directors, and School Superintendents.

The interest maturity scale was constructed so that a low score means that a person's interests resemble those of 15-year-olds, and a high score means his interests resemble those of 25-year-olds.[4] The significant positive score on this scale then would indicate that the vocational interests of the men in this study are relatively mature and stable.

The occupational level scale was constructed so that a low score indicates interests similar to those of manual laborers, and a high score indicates vocational interests more

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[3] Edward K. Strong, Jr., Strong Vocational Interest Blanks Manual (Palo Alto, California: Consulting Psychologists Press, 1959), p. 7.

[4] Ibid., p. 10.

TABLE XXIX

SCALES OF THE STRONG VOCATIONAL INTEREST BLANK ON WHICH VIRGINIA EXTENSION AGENTS-AGRICULTURE HAD SIGNIFICANT SCORES

SVIB Scale	Direction and amount of significance
Artist	- 4.94
Farmer	4.21
Forest Service Man	17.54
Y.M.C.A. Physical Director	7.76
School Superintendent	8.25
Author-Journalist	- 6.47
Interest Maturity	5.96
Occupational Level	5.39

nearly like those of business and professional men.[5] Thus, it can be said that the men in this study are highly professional, as shown by the Strong Vocational Interest Blank.

All Significant Variables

In the presentation of findings within the hypothetical framework, only those variables about which hypotheses had been made were treated. All 129 of the independent variables were correlated with the two dependent, or criterion, variables, and the following reports all significant results of the correlation, using the .05 level of significance.

Tenure. In Table XXX can be seen the significant results of correlating all independent variables with the criterion variable for tenure, total years employed by the Virginia Cooperative Extension Service.

Two variables had positive significant relationship to tenure. The variable Age of Agent could hardly be expected to do anything other than increase as tenure increases. The SVIB scale for Life Insurance Salesman was barely significant with an r of 0.23.

Thirteen of the occupational scales of the Strong Vocational Interest Blank showed a negative relationship to tenure. It is felt that this result should be interpreted as substantiating an earlier finding, namely, that the older

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[5] Ibid.

TABLE XXX

ALL VARIABLES HAVING A SIGNIFICANT CORRELATION TO TENURE

Variable	N	Mean score	Standard deviation	Correlation coefficient
Positive Correlations				
Age of Agent	77	36.44	10.82	.85
SVIB-Life Insurance Salesman	77	33.84	9.39	.23
Negative Correlations				
Adaptability Test Score	77	19.95	6.27	-.45
SVIB-Physician	77	27.81	10.75	-.26
Osteopath	77	32.99	9.80	-.34
Veterinarian	77	35.31	10.74	-.26
Chemist	77	22.31	11.00	-.24
Production Manager	77	34.75	9.29	-.29
Forest Service Man	77	34.64	11.96	-.39
Aviator	77	29.60	11.56	-.51
Industrial Arts Teacher	77	26.81	14.25	-.23
Policeman	77	32.56	9.09	-.31
Army Officer	77	27.87	13.03	-.42
Public Administrator	77	41.49	10.21	-.30
Physical Therapist	77	35.88	11.84	-.30
Senior C.P.A.	77	32.86	9.14	-.34
Group II	77	28.78	10.50	-.24
Masculinity-Femininity	77	47.17	9.81	-.32
Undergraduate Curriculum				
G.P.A. in Animal Sciences	57	2.05	0.49	-.28
G.P.A. in Mech. Sciences	56	1.82	0.62	-.46
Hours in Basic Sciences	63	56.65	22.33	-.25
Hours in Humanities	63	10.21	9.22	-.36
Hours in History, Political Science and Government	63	4.13	4.20	-.57
Total Hours Attempted	63	209.67	51.95	-.34
Beyond Undergraduate Curriculum				
G.P.A. in Social Sciences	27	2.14	0.84	-.61
G.P.A. in Economics	17	2.07	0.85	-.57
G.P.A. in Communications	4	1.75	1.09	-.95
Overall G.P.A.	31	2.27	0.62	-.48

G.P.A. = Grade Point Average

agents tended to generally show a lower level of interests on the majority of the Strong scales. This situation makes more difficult the task of predicting tenure.

The significant negative correlation of the Masculinity-Femininity scale of the SVIB indicates that as the agents become older, their interests become more like the opposite sex. There was also a very significant (.01) difference between the mean scores of the three tenure groups for this variable. The older group had the mean score nearer the feminine end of the scale.

Performance. All the variables in the study having a significant relationship to the performance criterion, performance rating index, are shown in Table XXXI.

Of particular interest is the negative relationships found between performance and undergraduate credit hours in the areas of education and agricultural education. When these two areas of study were analyzed by performance groups according to the specifications of the hypotheses, no significant relationships were found. Therefore, there is some indication from the data that the more effective agents have fewer academic credit hours in education and agricultural education.

The Service Rating Score

For the purpose of establishing employee performance levels, and constituting groups based upon performance for use in this investigation, initial plans were to use the

TABLE XXXI

ALL VARIABLES HAVING A SIGNIFICANT CORRELATION TO PERFORMANCE

Variable	N	Mean score	Standard deviation	Correlation coefficient
Positive Correlations				
Service Rating Score	77	86.21	3.03	.70
Beyond Undergraduate Curriculum				
G.P.A. in Plant Sciences	14	2.62	0.46	.60
Negative Correlations				
Undergraduate Curriculum				
Hours in Education	63	0.62	1.51	-.39
Hours in Agricultural Education	63	4.44	8.83	-.30
G.P.A. in Psychology	39	1.31	0.69	-.38
Beyond Undergraduate Curriculum				
G.P.A. in Basic Sciences	5	2.00	0.63	-.91

G.P.A. = Grade Point Average

Service Rating Scores. These scores are obtained through a personnel rating system used by the State of Virginia. The employee is rated poor, fair, good, very good, or excellent for each of the following elements: habits of work, amount of work, quality of work, cooperation, intelligence, and initiative. A numerical score is derived from this process and is called the Service Rating Score.[6]

It was originally intended to use the Service Rating Scores for establishing performance levels. However, when the scores resulting from ratings made early in 1966 were obtained and analyzed, there was little discrimination. The scores had a range from 78 to 92 and when divided into thirds, less than three points separated the high and low groups. When this situation was discovered, the decision was made to use a more discriminating system, and the Lawshe-Kephart Personnel Comparison System was used.[7]

Although the Performance Rating Index derived from the Personnel Comparison System was used as the criterion for analysis by performance, the Service Rating Scores were left in the design of the study to observe their comparison with the more objective Personnel Comparison System.

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[6] Commonwealth of Virginia, Governor's Office, Service Rating of State Employees Under the Virginia Personnel Act, Division of Personnel, Richmond, Virginia, July 1, 1949.

[7] C. H. Lawshe and N. C. Kephart, Manual for Use with the Lawshe-Kephart Personnel Comparison System, Occupational Research Center, Purdue University, Lafayette, Indiana, 1950.

When the two performance rating systems are compared by tenure groups of Virginia Extension Agents-Agriculture, they have the relationship shown in Table XXXII.

The difference in the mean or the standard deviation for these groups was not significant at the .05 level of confidence with either of the performance rating systems.

There is quite a different outcome when the two scores are compared by the performance groups which were constituted on the basis of the Performance Rating Indices. Table XXXIII shows these comparisons.

The differences in the means between the groups were very significant (.01) for both the rating scores. However, only the Performance Rating Index had a significant difference in the variance between the three groups.

The Service Rating Score had a .70 correlation (r) to the Performance Rating Index.

On the basis of these findings, it is felt that the Virginia Service Rating system is a valid one to use. However, as it is being used, very little dispersion in the scores results and hence the discriminatory power is drastically reduced.

The Relationship of Tenure and Performance

The preceding analysis has shown the Service Rating Score to differentiate between the more effective and less effective agents rather well. Since that system of personnel rating is used in Virginia, the present analysis will use

TABLE XXXII

MEAN SCORE AND F RATIO; STANDARD DEVIATION AND CHI SQUARE FOR PERFORMANCE SCORES USING TWO DIFFERENT RATING SYSTEMS, BY TENURE GROUPS

Tenure group	Performance rating index		Service rating score	
	Mean	S.D.	Mean	S.D.
Short	46.04	8.93	86.04	2.77
Medium	53.86	11.44	86.90	3.17
Long	49.37	14.46	85.54	3.12
F Ratio	2.94		1.36	
Chi Square		5.15		0.48

TABLE XXXIII

MEAN SCORE AND F RATIO; STANDARD DEVIATION AND CHI SQUARE FOR PERFORMANCE SCORES USING TWO DIFFERENT RATING SYSTEMS, BY PERFORMANCE GROUPS

Performance group	Performance rating index		Service rating score	
	Mean	S.D.	Mean	S.D.
Low	36.67	6.78	83.87	2.42
Medium	49.97	3.06	85.90	2.30
High	63.46	7.20	88.92	2.22
F Ratio	126.86*		28.84*	
Chi Square		18.94*		0.16

*Statistically significant at the .01 level

both the Service Rating Score and the Performance Rating Index as the criteria for performance.

The statistics in Table XXXII show that there is no significant difference in the Service Rating Score or the Performance Rating Index assigned to agents of the three tenure groups. This means that as many agents who have short tenure may be considered high performers as may those who have long tenure.

In correlating these variables, the Performance Rating Index had a -0.00 relationship to total years employed, or tenure, and the Service Rating Score had a -0.10 relationship to the tenure criterion. This supports the finding presented in the preceding paragraph.

High performance, then, is as much a characteristic of short tenure agents as long tenure agents.

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

Based upon the preceding findings, both within and outside the hypothetical framework, the following conclusions and recommendations are made.

Conclusions

It was concluded that:

1. Virginia Extension Agents-Agriculture with longer tenure are not also significantly higher performers. Therefore, any efforts to predict tenure on the basis of those factors found to be significantly related to tenure in this study might also be predicting medium or low performance. Because of this, no further conclusions regarding tenure were made.
2. There is no significant difference in the adaptability, or mental ability, of more effective and less effective Virginia Extension Agents-Agriculture.
3. There is no significant difference in the overall academic grade point average of more effective and less effective Virginia Extension Agents-Agriculture.

4. There is a significant negative relationship between the undergraduate academic credit hours completed by Virginia Extension Agents-Agriculture in education and agricultural education, and their performance ratings (r = -.39 and -.30 respectively).
5. There is a significant negative relationship between the undergraduate grade point average received by Virginia Extension Agents-Agriculture in psychology and their performance ratings (r = -.38).
6. Virginia Extension Agents-Agriculture have vocational interests significantly like Farmers, Forest Service Men, Y. M. C. A. Physical Directors, and School Superintendents.
7. Virginia Extension Agents-Agriculture have mature and stable vocational interests, and are highly professional.
8. The Adaptability Test and the Strong Vocational Interest Blank failed to discriminate between the more effective and less effective Virginia Extension Agents-Agriculture.
9. High performance and low performance agents in this study possessed essentially the same characteristics.
10. This investigation fails to provide a conclusive basis for establishing a set of criteria for predicting the tenure and performance of applicants.

Recommendations

It is recommended that:

1. Raters evaluating personnel and assigning Service Rating Scores spread the scores over a greater range in order to give the rating more meaning for the employee and employer alike.
2. An investigation be conducted of the relationship of performance to tenure over a long period of time. This effort should try to determine why performance does not improve significantly with increased tenure. A question which might be explored is, do high performing personnel resign or "taper off" after ten to twelve years of employment? Or, is it possible that administrative personnel policies, and especially those regarding the rating procedure, are reflected in the insignificant relationship of tenure and performance?
3. A study be made of the relationship of personality characteristics and background factors to performance.
4. A study be conducted in which the type of data used in this study would be collected from former extension personnel who have resigned and analyzed and compared with the findings of this study.

APPENDICES

APPENDIX A

INSTRUCTIONS TO DISTRICT AGENTS FOR EXECUTING THE PAIRED COMPARISON

HOW TO USE THE PAIRED-COMPARISON RATING SCALE

The purpose of this rating scale is to rate Extension Agents according to certain criteria. This is a very careful and precise method of comparing each employee with every other employee under your supervision. Only those employees who are a part of this research study are included in this particular rating. Your ratings will be kept strictly confidential.

You are to make a judgment about each pair of names, skipping none, in the order in which the cards are assembled. Even though some employees included in the pairs may have resigned, other information is complete on each one and it is therefore important that you make a judgment about each pair for which there is a card.

Consistency in judgment is not important. What you will be doing is to judge on each pair of names independent of your judgment on previous pairs.

The judgment, or rating, you are to make regarding the Agents in this study who are in your district should be made according to the following criterion:

> "Which of these two Extension Agents is more effective in his Extension job at the present time?"

Your first impression is usually the best. What is needed here is your first judgment, just as you would make a quick decision for action in the regular course of your work.

On each card make a check (✓) immediately before the name of the employee whom you judge to be the more effective. This should be done for each pair in order. Go on to the next card at once.

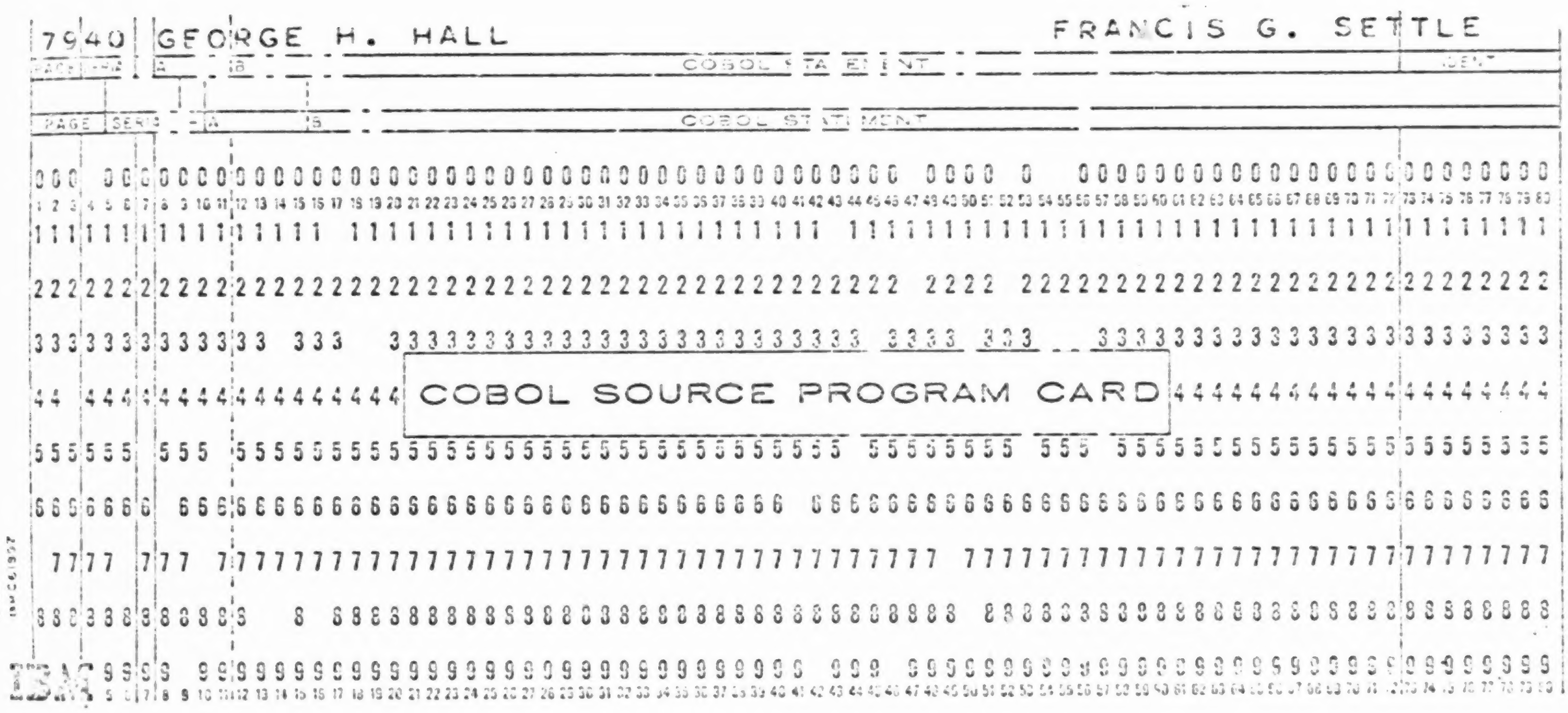
Please use care in handling the deck so as not to bend or mutilate the cards as this makes them difficult to process in the I.B.M. machines.

Return the completed cards to:

Don Moore
8517 Glen Dale Road
Greenbelt, Maryland
20770

APPENDIX B

PAIR CARD FOR THE
PAIRED COMPARISON RATING



7940 GEORGE H. HALL FRANCIS G. SETTLE

COBOL SOURCE PROGRAM CARD

PAGE
SERIAL
A
B
COBOL STATEMENT
IDENT.
IBM

APPENDIX C

ADAPTABILITY TEST--FORM A

ADAPTABILITY TEST

by JOSEPH TIFFIN, Ph.D. and C. H. LAWSHE, Ph.D.
Occupational Research Center PURDUE UNIVERSITY

NAME (Last) (First)
DATE
SCORE
PERCENTILE

Some jobs require figuring—such as adding, subtracting, multiplying, and dividing—while others require writing reports or answering letters, and still other jobs can be done well by people who are not particularly apt with figures or words. This test will help in determining how well you can handle jobs that require these abilities.

Do as well as you can on this test, but do not worry about it. Remember that you may be well qualified for certain jobs that require training or skills different from those covered in this test.

HERE IS A SAMPLE QUESTION:

Which of the words below tells what an orange is?
(1) animal (2) flower (3) fruit (4) vegetable (5) cloth....................(3)

The correct answer is "fruit." Since the word "fruit" is number (3), the number (3) has been written in the blank space at the right.

NOW LOOK AT THIS QUESTION:

What is the seventh letter in the alphabet?............................(G)

The seventh letter in the alphabet is G, so the letter G has been written in the blank at the right.

NOW, WRITE THE ANSWER TO THIS QUESTION YOURSELF:

If one pencil costs 5c, how many cents will six pencils cost?................(________)

The answer to this question is 30, so you should have written the number 30 in the blank at the end of the question.

TRY THIS ONE:

What is the first letter of a three-letter word meaning a tool used by carpenters to cut wood?
....(________)

The word of course is "saw," so the letter S should be written in the blank at the end of the question. All of the questions in this test are similar in form to those given above.

REMEMBER:

1. If the answer to a question is a LETTER or a NUMBER, write the letter or number in the blank at the end of the question.
2. If several answers are suggested (as in the first question above), write the NUMBER of the correct answer in the blank at the end of the question.

Work as rapidly as you can without making unnecessary mistakes. You will not be able to answer all of the questions. When you find a question you cannot answer, do not spend too much time on it, but go on to the next question. Do not skip around, but take all of the problems in order.

DO NOT TURN THE PAGE UNTIL TOLD TO DO SO

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1. The statement, "There is something in the way he deals that makes me want to cut the cards," indicates what on the part of the speaker?
(1) indecision (2) scorn (3) fear (4) hate (5) suspicion .... (______)

2. The statement, "No one is able to stop me; I will do that which I intend to do or die in the attempt," indicates what on the part of the speaker?
(1) determination (2) loneliness (3) ambition (4) rage (5) hypocrisy .... (______)

3. What is the first letter of a three-letter word meaning money collected by the government?............ (______)

4. In the following series of numbers, how many times does 2 follow 3?
5 3 2 7 3 2 9 3 2 6 2 8 3 2.. (______)

5. Which of the following multiplications is right?
(1) 6 × 23 = 148 (2) 3 × 59 = 158
(3) 6 × 56 = 316 (4) 7 × 85 = 595
(5) 3 × 82 = 236 .... (______)

6. The temperature in a tool shed is 18 degrees above zero and the temperature outside is 6 degrees below zero. How many degrees difference is there between the two temperatures? .... (______)

7. Which of the following words makes the truest sentence? A father is always (?) than his son.
(1) heavier (2) older (3) taller (4) wiser (5) younger .... (______)

8. Which of the following pairs of words have the SAME meaning?
(1) prohibit—allow (2) tonic—stimulant (3) wary—foolhardy
(4) recent—ancient (5) ferocious—mild .... (______)

9. What is the first letter of a five-letter word meaning extra money paid at the end of a work period?...... (______)

10. Which of the following pairs of words have OPPOSITE meanings?
(1) transient—permanent (2) comfort—console (3) enraged—angry
(4) augment—increase (5) kingly—regal .... (______)

11. John earns $20 a week. John earns twice as much as Harry earned before Harry had his salary doubled. How much per week does Harry earn?.............................. (______)

12. Which of the words below does NOT belong in the list?
(1) rabbit (2) whale (3) muskrat (4) seal (5) fox .... (______)

13. A stool has four legs 21 inches, 20½ inches, 20 inches, and 22 inches long. What is the smallest total number of inches that must be cut from the legs to make the stool level? .... (______)

14. What is the first letter of a fourteen-letter word meaning a person in charge of a plant?............... (______)

15. A workman was making $2.40 per day. His wages were raised to $3.30 per day making a raise of 15 cents an hour. How many hours per day was he working?.................. (______)

16. SOUND is to SILENCE as SUNLIGHT is to:
(1) evening (2) moonlight (3) night time (4) twilight (5) darkness.................. (______)

17. George drives 18 miles to work. George drives three times as far as Tom did before Tom moved two miles closer to the plant. How far does Tom drive to work?...................... (______)

18. What number is missing in this series?
5 — 7 — 10 — 14 — 19 — (?).. (______)

19. What is the first letter of a nine-letter word meaning a talk with a hiring official?. (________)

20. A certain letter is the fifth letter before "M" in the alphabet. Another letter is the third letter after "M" in the alphabet. What letter is midway between these two letters? . . . . (________)

21. If the words below were arranged to make the best sentence, with what letter would the last word of the sentence end?
employees cooperation many poor fail causes to . . . . (________)

22. BLUEPRINT is to BUILDING as PATTERN is to:
(1) sewing machine (2) dressmaker (3) dress (4) foundation (5) cloth. . . . . (________)

23. If the words below were arranged to make the best sentence, with what letter would the last word of the sentence end?
tools have workmen good not dull do. . . . . (________)

24. A man spent $15.00 or ⅝ of his check for room and board. How much was his check?. . . . . (________)

25. Which of the following pairs of words have the SAME meaning?
(1) tart—acid (2) waste—conserve (3) enthusiasm—ennui
(4) cowardly—brave (5) beautiful—ugly . . . . (________)

26. If the first two of the following sentences are true, the third is (?). Successful men work hard. Jones works hard. Jones is a successful man.
(1) true (2) false (3) not certain . . . . (________)

27. What number is missing in this series?
11 — 18 — 16 — 23 — 21 — (?). . . . . (________)

28. Which of the following pairs of words have OPPOSITE meanings?
(1) exalt—rejoice (2) certify—attest (3) incite—quell
(4) tiny—minute (5) analogous—similar . . . . (________)

29. During a particular week John worked 1-3/4 days and 2-1/2 days. George worked 1-1/2 and 2-2/3 days. How many more days did John work than George?. . . . . (________)

30. If two diagonals are drawn across a square, how many large and small triangles will be formed?. . . . . (________)

31. You have a nickel, a dime, and a quarter. A clerk shows you several articles, each a different price and any one of which you could purchase with your coins without receiving change. What is the largest number of articles he could have shown you? . . . . (________)

32. What is the third letter of a six-letter word beginning with "R" and meaning "to lie at rest?". . . . . (________)

33. What number is missing in this series?
15-2/3 15-1/3 15-2/3 15 15-2/3 14-2/3 (?). . . . . (________)

34. What is the first letter of a five-letter word meaning avocation?. . . . . (________)

35. Ten books, each two inches thick, are arranged on a library shelf. How many inches are there between the front cover of the second book and the back cover of the seventh book? . . . . (________)

APPENDIX D

STRONG VOCATIONAL INTEREST BLANK
TEST BOOKLET

FORM M
MACHINE SCORED EDITION

STRONG
VOCATIONAL INTEREST BLANK
FOR MEN
(Revised)

BY
EDWARD K. STRONG, JR.
STANFORD UNIVERSITY

IT IS POSSIBLE with a fair degree of accuracy to determine by this test whether or not you would like certain occupations. The test is not one of intelligence or school work. It measures the extent to which **your** interests agree or disagree with those of successful men in a given occupation.

In addition to this question booklet, you should have a **special answer sheet or cards** on which to record your responses. MAKE NO MARKS AT ALL ON THIS BOOKLET. Please read the following directions carefully:

1. Do **not** use a ball point or any other kind of pen. If you have been given a special pencil, use it. If not, mark with any soft, black lead pencil.

2. If you make a mistake, erase carefully. If you accidentally make stray marks on the answer sheets, erase them also. Do not fold or crease your answer sheet in any way.

3. You must make one mark for each of the 400 questions. If you omit items, or make more than one mark, the machine cannot score your test. If you are not familiar with a particular item, guess how you might feel about it and mark accordingly.

4. Listen carefully to any instructions given orally. In some parts of the test, the directions change; read the instructions at the beginning of each part.

5. Be sure to fill in your name and other information requested on your answer sheet or card. In some cases, it is necessary to code your name by marking spots representing each letter.

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Part I. Occupations. Indicate for each occupation listed below whether you would like that kind of work or not. Don't worry about whether you would be good at the job or about your possible lack of training in it. Forget about how much money you can make in it, or whether you can get ahead in it. Think only about whether you would like the work that has to be done in the job.

Mark on the answer sheet in the column labeled "L" if you like that kind of work
Mark in the column labeled "I" if you are indifferent (that is, don't care one way or another)
Mark in the column labeled "D" if you don't like that kind of work

Work fast. Put down the first thing that comes to mind. Answer every one.

1 Actor (not movie)
2 Advertiser
3 Architect
4 Army Officer
5 Artist

6 Astronomer
7 Athletic Director
8 Auctioneer
9 Author of novel
10 Author of technical book

11 Auto Salesman
12 Auto Racer
13 Auto Repairman
14 Aviator
15 Bank Teller

16 Bookkeeper
17 Building Contractor
18 Buyer of merchandise
19 Carpenter
20 Cartoonist

21 Cashier in bank
22 Certified Public Accountant
23 Chemist
24 Civil Engineer
25 Civil Service Employee

26 Clergyman
27 College Professor
28 Consul
29 Dentist
30 Draftsman

31 Editor
32 Electrical Engineer
33 Employment Manager
34 Explorer
35 Factory Manager

36 Factory Worker
37 Farmer
38 Floorwalker
39 Florist
40 Foreign Correspondent

41 Governor of a State
42 Hotel Keeper or Manager
43 Interior Decorator
44 Interpreter
45 Inventor

46 Jeweler
47 Judge
48 Labor Arbitrator
49 Laboratory Technician
50 Landscape Gardener

51 Lawyer, Criminal
52 Lawyer, Corporation
53 Librarian
54 Life Insurance Salesman
55 Locomotive Engineer

56 Machinist
57 Magazine Writer
58 Manufacturer
59 Marine Engineer
60 Mechanical Engineer

61 Mining Superintendent
62 Musician
63 Music Teacher
64 Office Clerk
65 Office Manager

66 Orchestra Conductor
67 Pharmacist
68 Photo Engraver
69 Physician
70 Playground Director

71 Poet
72 Politician
73 Printer
74 Private Secretary
75 Railway Conductor

76 Rancher
77 Real Estate Salesman
78 Reporter, general
79 Reporter, sporting page
80 Retailer

81 Sales Manager
82 School Teacher
83 Scientific Research Worker
84 Sculptor
85 Secretary, Chamber of Commerce

86 Secret Service Man
87 Ship Officer
88 Shop Foreman
89 Social Worker
90 Specialty Salesman

91 Statistician
92 Stock Broker
93 Surgeon
94 Toolmaker
95 Traveling Salesman

96 Typist
97 Undertaker
98 Watchmaker
99 Wholesaler
100 Worker in Y.M.C.A., K. of C., etc.

Part II. School Subjects. Show as you did in Part I your interest in these school subjects, even though you may not have studied them.

101 Algebra
102 Agriculture
103 Arithmetic
104 Art
105 Bookkeeping

106 Botany
107 Calculus
108 Chemistry
109 Civics
110 Dramatics

111 Economics
112 English Composition
113 Geography
114 Geology
115 Geometry

116 History
117 Languages, ancient
118 Languages, modern
119 Literature
120 Mathematics

121 Manual Training
122 Mechanical Drawing
123 Military Drill
124 Music
125 Nature Study

126 Philosophy
127 Physical Training
128 Physics
129 Psychology
130 Physiology

131 Public Speaking
132 Shop work
133 Sociology
134 Spelling
135 Typewriting

136 Zoölogy

Part III. Amusements. Show in the same way as you did before in Parts I and II whether or not you like these ways of having fun. Work rapidly. Do not think over various possibilities. Record your first feeling of liking, indifference or disliking.

137 Golf
138 Fishing
139 Hunting
140 Tennis

141 Driving an automobile
142 Taking long walks
143 Boxing
144 Chess
145 Poker

146 Bridge
147 Observing birds (nature study)
148 Solving mechanical puzzles
149 Performing sleight-of-hand tricks
150 Collecting postage stamps

151 Drilling in a company
152 Chopping wood
153 Amusement parks
154 Picnics
155 Excursions

156 Smokers
157 "Rough house" initiations
158 Conventions
159 Full-dress affairs
160 Auctions

161 Fortune tellers
162 Animal zoos
163 Art galleries
164 Museums
165 Vaudeville

166 Musical comedy
167 Symphony concerts
168 Pet canaries
169 Pet monkeys
170 Snakes

171 Sporting pages
172 Poetry
173 Detective stories
174 "Time"
175 "Judge"

176 "New Republic"
177 "System"
178 "National Geographic Magazine"
179 "American Magazine"
180 "Popular Mechanics"

181 "Atlantic Monthly"
182 Educational movies
183 Travel movies
184 Social problem movies
185 Making a radio set

Part IV. Activities. Show in the same way as you did before how you feel about these activities.

186 Repairing a clock
187 Adjusting a carburetor
188 Repairing electrical wiring
189 Cabinetmaking
190 Operating machinery

191 Handling horses
192 Giving "first aid" assistance
193 Raising flowers and vegetables
194 Decorating a room with flowers
195 Arguments

196 Interviewing men for a job
197 Interviewing prospects in selling
198 Interviewing clients
199 Making a speech
200 Organizing a play

201 Opening conversation with a stranger
202 Teaching children
203 Teaching adults
204 Calling friends by nicknames
205 Being called by a nickname

206 Meeting and directing people
207 Taking responsibility
208 Meeting new situations
209 Adjusting difficulties of others
210 Drilling soldiers

211 Pursuing bandits in sheriff's posse
212 Doing research work
213 Acting as yell-leader
214 Writing personal letters
215 Writing reports

216 Entertaining others
217 Bargaining ("swapping")
218 Looking at shop windows
219 Buying merchandise for a store
220 Displaying merchandise in a store

221 Expressing judgments publicly regardless of criticism
222 Being pitted against another as in a political or athletic race
223 Methodical work
224 Regular hours for work
225 Continually changing activities

226 Developing business systems
227 Saving money
228 Contributing to charities
229 Raising money for a charity
230 Living in the city

231 Climbing along edge of precipice
232 Looking at a collection of rare laces
233 Looking at a collection of antique furniture

Part V. Peculiarities of People. Show your feeling about these different kinds of people. Do not think of various possibilities or of exceptional cases. "Let yourself go" and record the feeling that comes to mind as you read each item.

234 Progressive people
235 Conservative people

236 Energetic people
237 Absent-minded people
238 People who borrow things
239 Quick-tempered people
240 Optimists

241 Pessimists
242 People who are natural leaders
243 People who assume leadership
244 People easily led
245 People who have made fortunes in business

246 Emotional people
247 Thrifty people
248 Spendthrifts
249 Talkative people
250 Religious people

251 Irreligious people
252 People who have done you favors
253 People who get rattled easily
254 Gruff men
255 Foreigners

256 Sick people
257 Nervous people
258 Very old people
259 Cripples
260 Side-show freaks

261 People with gold teeth
262 People with protruding jaws
263 People with hooked noses
264 Blind people
265 Deaf mutes

266 Self-conscious people
267 People who always agree with you
268 People who talk very loudly
269 People who talk very slowly
270 People who talk about themselves

271 Fashionably dressed people
272 Carelessly dressed people
273 People who don't believe in evolution
274 Socialists
275 Bolshevists

276 Independents in politics
277 Men who chew tobacco
278 Men who use perfume
279 People who chew gum
280 Athletic men

THE INSTRUCTIONS FOR THIS PART ARE DIFFERENT

Part VI. Order of Preference of Activities. Here are ten things you could do. **First read all ten.** Then pick out **three** of them, the 3 things you think you would like best to do. Mark opposite these 3 numbers in column (or row) 1. Then select the three things you would like **least** to do, and show which they are by marking in column (or row) 3. Then **mark the remaining 4 items in the middle column (or row),** where no marks have been made so far.

281 Develop the theory of operation of a new machine, e.g., auto
282 Operate (manipulate) the new machine
283 Discover an improvement in the design of the machine
284 Determine the cost of operation of the machine
285 Supervise the manufacture of the machine

286 Create a new artistic effect, i.e., improve the beauty of the auto
287 Sell the machine
288 Prepare the advertising for the machine
289 Teach others the use of the machine
290 Interest the public in the machine through public addresses

Show in the same way as above what you think are the three things that mean the most to you in a job; then the three least important things. Mark the 4 items left over in the middle column. Be sure you have marked the **three most important in column 1,** the **three least important in column 3,** the **remaining four in column 2.**

291 Salary received for work
292 Steadiness and performance of work
293 Opportunity for promotion
294 Courteous treatment from superiors
295 Opportunity to make use of all one's knowledge and experience

296 Opportunity to ask questions and to consult about difficulties
297 Opportunity to understand just how one's superior expects work to be done
298 Certainty one's work will be judged by fair standards
299 Freedom in working out one's own methods of doing the work
300 Co-workers—congenial, competent, and adequate in number

Show in the same way the three men you would most like to have been; then the three you would least like to have been. Mark the remaining four in the middle column. If you don't recognize the names, respond to the occupation.

301 Luther Burbank, "plant wizard"
302 Enrico Caruso, singer
303 Thomas A. Edison, inventor
304 Henry Ford, manufacturer
305 Charles Dana Gibson, artist
306 J. P. Morgan, financier
307 J. J. Pershing soldier
308 William H. Taft, jurist
309 Booth Tarkington, author
310 John Wanamaker, merchant

Show in the same way the three offices you would like most to hold in a club or society; also mark the three you would least like to hold. Mark the 4 offices left over in column 2.

311 President of a Society or Club
312 Secretary of a Society or Club
313 Treasurer of a Society or Club
314 Member of a Society or Club
315 Chairman, Arrangement Committee
316 Chairman, Educational Committee
317 Chairman, Entertainment Committee
318 Chairman, Membership Committee
319 Chairman, Program Committee
320 Chairman, Publicity Committee

Please check and see that in each of the four parts you have 3 check marks in both columns 1 and 3, and 4 marks in column 2.

Part VII. Comparison between Two Items. Show here which of two different kinds of work, ways of doing things., etc., you like better. If you prefer the items on the left mark in the first column; if you prefer the items on the right mark in the third column. If you like both the same or if you can't decide which one you like better, mark in the second column. Work rapidly. Make one mark for each pair.

Street-car motorman	321	Street-car conductor
Policeman	322	Fireman (fights fire)
Chauffeur	323	Chef
Head waiter	324	Lighthouse tender
House-to-house canvassing	325	Retail selling
House-to-house canvassing	326	Gardening
Repair auto	327	Drive auto
Develop plans	328	Execute plans.
Do a job yourself	329	Delegate job to another
Persuade others	330	Order others
Deal with things	331	Deal with people
Plan for immediate future	332	Plan for 5 years ahead
Activity which produces tangible returns	333	Activity which is enjoyed for its own sake
Taking a chance	334	Playing safe
Definite salary	335	Commission on what is done
Work for yourself	336	Carry out program of superior who is respected
Work which interests you with modest income	337	Work which does not interest you with large income
Work in a large corporation with little chance of becoming president until age of 55	338	Work for self in small business
Selling article, quoted 10% below competitor	339	Selling article, quoted 10% above competitor
Small pay, large opportunities to learn during next 5 years	340	Good pay, little opportunity to learn during next 5 years
Work involving few details	341	Work involving many details
Outside work	342	Inside work
Change from place to place	343	Working in one location
Great variety of work	344	Similarity in work
Physical activity	345	Mental activity
Emphasis upon quality of work	346	Emphasis upon quantity of work
Technical responsibility (head of a department of 25 people engaged in technical, research work)	347	Supervisory responsibility (head of a department of 300 people engaged in typical business operation)
Present a report in writing	348	Present a report verbally
Listening to a story	349	Telling a story
Playing baseball	350	Watching baseball
Amusement where there is a crowd	351	Amusement alone or with one or two others
Nights spent at home	352	Nights away from home
Reading a book	353	Going to movies
Belonging to many societies	354	Belonging to few societies
Few intimate friends	355	Many acquaintances
Many women friends	356	Few women friends
Fat men	357	Thin men
Tall men	358	Short men
Jealous people	359	Conceited people
Jealous people	360	Spendthrifts

Part VIII. Rating Your Abilities and Personality. Show here what kind of person you are right now and the kinds of things you do. If the item really describes you, mark in the first column ("Yes"); if the item does **not** describe you mark in the third column ("No"); and if you are not sure mark in the second column ("?"). (Be frank in pointing out your weak points, because these are as important as your strong points in choosing a career.)

361 Usually start activities of my group
362 Usually drive myself steadily (do not work by fits and starts)
363 Win friends easily
364 Usually get other people to do what I want done
365 Usually liven up the group on a dull day

366 Am quite sure of myself
367 Accept just criticism without getting sore
368 Have mechanical ingenuity (inventiveness)
369 Have more than my share of novel ideas
370 Can carry out plans assigned by other people

371 Can discriminate between more or less important matters
372 Am inclined to keep silent (reticent) in confidential and semi-confidential affairs
373 Am always on time with my work
374 Remember faces, names, and incidents better than the average person
375 Can correct others without giving offense

376 Able to meet emergencies quickly and effectively
377 Get "rattled" easily
378 Can write a concise, well-organized report
379 Have good judgment in appraising values
380 Plan my work in detail

381 Follow up subordinates effectively
382 Put drive into the organization
383 Stimulate the ambition of my associates
384 Show firmness without being easy
385 Win confidence and loyalty

386 Smooth out tangles and disagreements between people
387 Am approachable
388 Discuss my ideals with others

Mark in the first, second, or third column for whichever one of the three statements best describes you. Choose one of the three for each numbered item.

389	(1) Feelings easily hurt	(2) Feelings hurt sometimes	(3) Feelings rarely hurt
390	(1) Usually ignore the feelings of others	(2) Consider them sometimes	(3) Carefully consider them
391	(1) Loan money to acquaintances	(2) Loan only to certain people	(3) Rarely loan money
392	(1) Rebel inwardly at orders from another, obey when necessary	(2) Carry out instructions with little or no feeling	(3) Enter into situation and enthusiastically carry out program
393	(1) When caught in a mistake usually make excuses	(2) Seldom make excuses	(3) Practically never make excuses
394	(1) Best-liked friends are superior to me in ability	(2) Equal in ability	(3) Inferior in ability
395	(1) Handle complaints without getting irritated	(2) Become annoyed at times	(3) Lose my temper at times
396	(1) Borrow frequently (for personal use)	(2) Borrow occasionally	(3) Practically never borrow
397	(1) Tell jokes well	(2) Seldom tell jokes	(3) Practically never tell jokes
398	(1) My advice sought by many	(2) Sought by few	(3) Practically never asked
399	(1) Frequently make wagers	(2) Occasionally make wagers	(3) Never make wagers
400	(1) Worry considerably about mistakes	(2) Worry very little	(3) Do not worry

Check your answer sheet or cards carefully to make sure you have not omitted any items or made more than one mark opposite any question number. Erase any stray marks. Be sure your name is on your answer sheet.

APPENDIX E

STRONG VOCATIONAL INTEREST BLANK
ANSWER SHEET

.S. ANSWER SHEET FOR—STRONG VOCATIONAL INTEREST BLANK—MEN

ONLY

1	41	81	121	161	201	241	PART VI 281	PART VII 321	PART VIII 361
2	42	82	122	162	202	242	282	322	362
3	43	83	123	163	203	243	283	323	363
4	44	84	124	164	204	244	284	324	364
5	45	85	125	165	205	245	285	325	365
6	46	86	126	166	206	246	286	326	366
7	47	87	127	167	207	247	287	327	367
8	48	88	128	168	208	248	288	328	368
9	49	89	129	169	209	249	289	329	369
10	50	90	130	170	210	250	290	330	370
11	51	91	131	171	211	251	291	331	371
12	52	92	132	172	212	252	292	332	372
13	53	93	133	173	213	253	293	333	373
14	54	94	134	174	214	254	294	334	374
15	55	95	135	175	215	255	295	335	375
16	56	96	136	176	216	256	296	336	376
17	57	97	PART III 137	177	217	257	297	337	377
18	58	98	138	178	218	258	298	338	378
19	59	99	139	179	219	259	299	339	379
20	60	100	140	180	220	260	300	340	380
21	61	PART II 101	141	181	221	261	301	341	381
22	62	102	142	182	222	262	302	342	382
23	63	103	143	183	223	263	303	343	383
24	64	104	144	184	224	264	304	344	384
25	65	105	145	185	225	265	305	345	385
26	66	106	146	PART IV 186	226	266	306	346	386
27	67	107	147	187	227	267	307	347	387
28	68	108	148	188	228	268	308	348	388
29	69	109	149	189	229	269	309	349	389
30	70	110	150	190	230	270	310	350	390
31	71	111	151	191	231	271	311	351	391
32	72	112	152	192	232	272	312	352	392
33	73	113	153	193	233	273	313	353	393
34	74	114	154	194	PART V 234	274	314	354	394
35	75	115	155	195	235	275	315	355	395
36	76	116	156	196	236	276	316	356	396
37	77	117	157	197	237	277	317	357	397
38	78	118	158	198	238	278	318	358	398
39	79	119	159	199	239	279	319	359	399
40	80	120	160	200	240	280	320	360	400

NAME ______ LAST ______ FIRST ______ INITIAL ______

SCHOOL ______

CITY ______

STATE ______

DATE ______

RUCTIONS ON REVERSE SIDE
ONLY ONE MARK FOR EACH QUESTION

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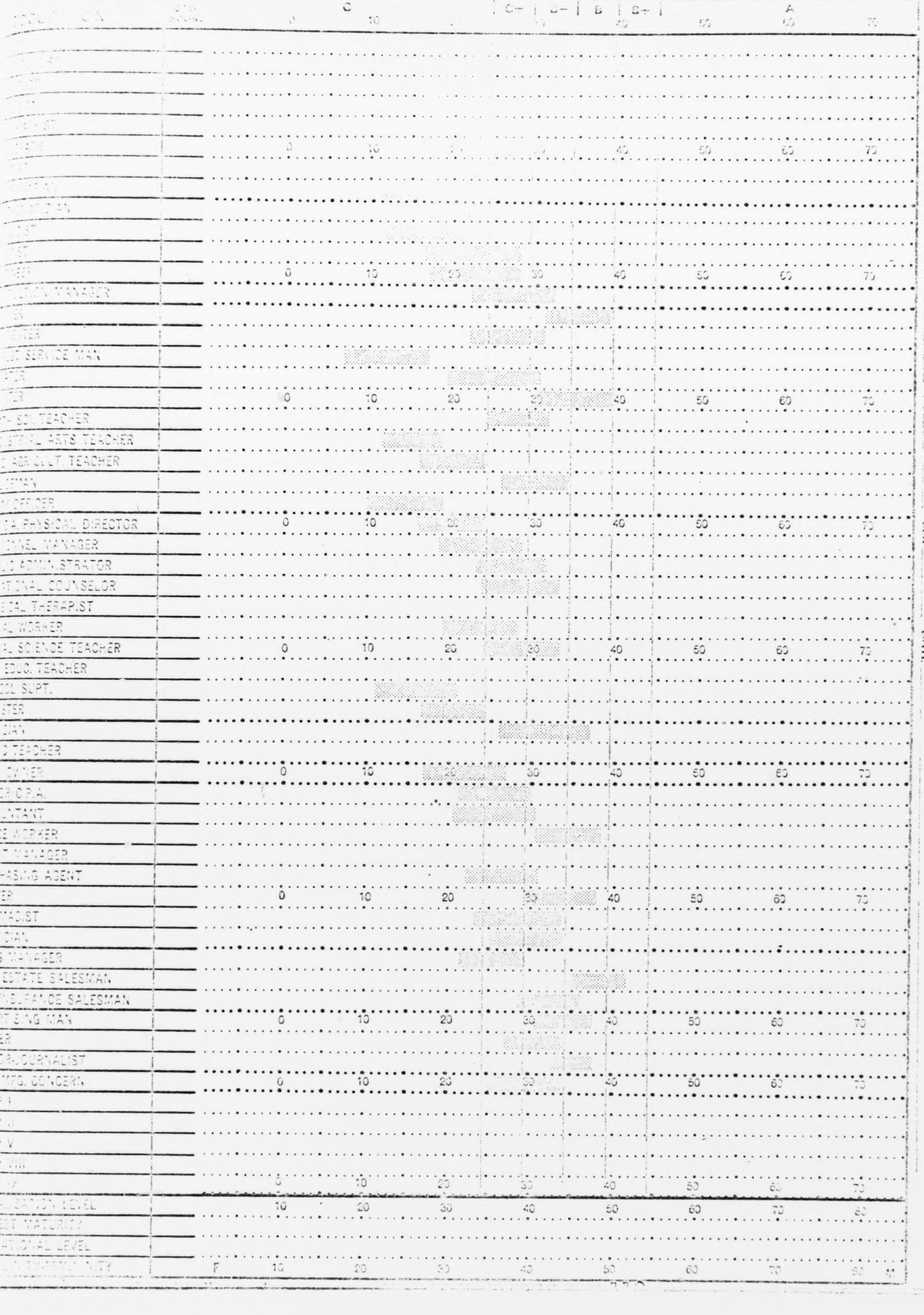
APPENDIX F

STRONG VOCATIONAL INTEREST BLANK
REPORT FORM

—FOR MEN



NAME

AGE

SEX

DATE

APPENDIX G

COLLEGE TRANSCRIPT DATA
COLLECTION FORMS

Serial, or Study, Number: ______________________ Name: ______________________

ACADEMIC YEARS ATTENDING			Beginning Major	Final Degree Major	Highest Degree Completed	Year of Graduation	
State Land-Grant College	Non-Land-Grant College	Other Land-Grant College					

Name and Address of Institution Attended	Credit Hour System	Total Hours Attempted	Total Hours Passed	Total Grade Points	Grade Point Average	Grade Point System	Conversion
		Total	Total	Total			

College	Plant Sciences	Animal Sciences	Mechanical Sciences	Basic Sciences	Humanities	Totals for Social Sciences	Other
	_Hrs. A (x3) ____ G.P. _Hrs. B (x2) ____ G.P. _Hrs. C (x1) ____ G.P. _Hrs. D _Hrs. F _Hrs. Totals ____ G.P. _Hrs. A (x3) ____ G.P. _Hrs. B (x2) ____ G.P. _Hrs. C (x1) ____ G.P. _Hrs. D _Hrs. F _Hrs. Totals ____ G.P. _Hrs. A (x3) ____ G.P. _Hrs. B (x2) ____ G.P. _Hrs. C (x1) ____ G.P. _Hrs. D _Hrs. F	_Hrs. A (x3) ____ G.P. _Hrs. B (x2) ____ G.P. _Hrs. C (x1) ____ G.P. _Hrs. D _Hrs. F _Hrs. Totals ____ G.P. _Hrs. A (x3) ____ G.P. _Hrs. B (x2) ____ G.P. _Hrs. C (x1) ____ G.P. _Hrs. D _Hrs. F _Hrs. Totals ____ G.P. _Hrs. A (x3) ____ G.P. _Hrs. B (x2) ____ G.P. _Hrs. C (x1) ____ G.P. _Hrs. D _Hrs. F	_Hrs. A (x3) ____ G.P. _Hrs. B (x2) ____ G.P. _Hrs. C (x1) ____ G.P. _Hrs. D _Hrs. F _Hrs. Totals ____ G.P. _Hrs. A (x3) ____ G.P. _Hrs. B (x2) ____ G.P. _Hrs. C (x1) ____ G.P. _Hrs. D _Hrs. F _Hrs. Totals ____ G.P. _Hrs. A (x3) ____ G.P. _Hrs. B (x2) ____ G.P. _Hrs. C (x1) ____ G.P. _Hrs. D _Hrs. F	_Hrs. A (x3) ____ G.P. _Hrs. B (x2) ____ G.P. _Hrs. C (x1) ____ G.P. _Hrs. D _Hrs. F _Hrs. Totals ____ G.P. _Hrs. A (x3) ____ G.P. _Hrs. B (x2) ____ G.P. _Hrs. C (x1) ____ G.P. _Hrs. D _Hrs. F _Hrs. Totals ____ G.P. _Hrs. A (x3) ____ G.P. _Hrs. B (x2) ____ G.P. _Hrs. C (x1) ____ G.P. _Hrs. D _Hrs. F	_Hrs. A (x3) ____ G.P. _Hrs. B (x2) ____ G.P. _Hrs. C (x1) ____ G.P. _Hrs. D _Hrs. F _Hrs. Totals ____ G.P. _Hrs. A (x3) ____ G.P. _Hrs. B (x2) ____ G.P. _Hrs. C (x1) ____ G.P. _Hrs. D _Hrs. F _Hrs. Totals ____ G.P. _Hrs. A (x3) ____ G.P. _Hrs. B (x2) ____ G.P. _Hrs. C (x1) ____ G.P. _Hrs. D _Hrs. F	_Hrs. A (x3) ____ G.P. _Hrs. B (x2) ____ G.P. _Hrs. C (x1) ____ G.P. _Hrs. D _Hrs. F _Hrs. Totals ____ G.P. _Hrs. A (x3) ____ G.P. _Hrs. B (x2) ____ G.P. _Hrs. C (x1) ____ G.P. _Hrs. D _Hrs. F _Hrs. Totals ____ G.P. _Hrs. A (x3) ____ G.P. _Hrs. B (x2) ____ G.P. _Hrs. C (x1) ____ G.P. _Hrs. D _Hrs. F	_Hrs. A (x3) ____ G.P. _Hrs. B (x2) ____ G.P. _Hrs. C (x1) ____ G.P. _Hrs. D _Hrs. F _Hrs. Totals ____ G.P. _Hrs. A (x3) ____ G.P. _Hrs. B (x2) ____ G.P. _Hrs. C (x1) ____ G.P. _Hrs. D _Hrs. F _Hrs. Totals ____ G.P. _Hrs. A (x3) ____ G.P. _Hrs. B (x2) ____ G.P. _Hrs. C (x1) ____ G.P. _Hrs. D _Hrs. F
Totals							
% of social science curriculum	X	X	X	X	X		
% of total curriculum							

BREAKDOWN FOR SOCIAL SCIENCES ONLY: Courses, Hours, Grades, and Grade Points

College	Education	Extension Education	Agricultural Education	Psychology	Economics	Sociology	Communications	Business and Public Administration	Political Science and Government
	_Hrs. A (x3) ____ G.P. _Hrs. B (x2) ____ G.P. _Hrs. C (x1) ____ G.P. _Hrs. D _Hrs. F	_Hrs. A (x3) ____ G.P. _Hrs. B (x2) ____ G.P. _Hrs. C (x1) ____ G.P. _Hrs. D _Hrs. F	_Hrs. A (x3) ____ G.P. _Hrs. B (x2) ____ G.P. _Hrs. C (x1) ____ G.P. _Hrs. D _Hrs. F	_Hrs. A (x3) ____ G.P. _Hrs. B (x2) ____ G.P. _Hrs. C (x1) ____ G.P. _Hrs. D _Hrs. F	_Hrs. A (x3) ____ G.P. _Hrs. B (x2) ____ G.P. _Hrs. C (x1) ____ G.P. _Hrs. D _Hrs. F	_Hrs. A (x3) ____ G.P. _Hrs. B (x2) ____ G.P. _Hrs. C (x1) ____ G.P. _Hrs. D _Hrs. F	_Hrs. A (x3) ____ G.P. _Hrs. B (x2) ____ G.P. _Hrs. C (x1) ____ G.P. _Hrs. D _Hrs. F	_Hrs. A (x3) ____ G.P. _Hrs. B (x2) ____ G.P. _Hrs. C (x1) ____ G.P. _Hrs. D _Hrs. F	_Hrs. A (x3) ____ G.P. _Hrs. B (x2) ____ G.P. _Hrs. C (x1) ____ G.P. _Hrs. D _Hrs. F
Totals									
% of social science curriculum									
% of total curriculum									

ENUMERATION SHEET FOR CREDIT HOURS

Serial, or Study, Number_______________ Name__________________________

This record applies to:
(check one)

Plant Sciences _____

Animal Sciences _____

Mechanical Sciences _____

Basic Sciences _____

Humanities _____

	A	B	C	D	F
Total Credit Hours Attempted					
	X 3	X 2	X 1		
Total Grade Points					

APPENDIX H

GENERAL CORRELATION PROGRAM FOR UNEQUAL N

GENERAL CORRELATION PROGRAM FOR UNEQUAL N

1. GENERAL DESCRIPTION

a. This program computes a Pearson-product moment correlation coefficient for m variables ($m \leq 50$), when the number of observations are unequal for different pairs of variables. Means and standard deviations are also computed. Missing data for any variable are blanks for any field width on the card.

b. Output from this job includes:

(1) Listing of card image which has any missing (blanks) data
(2) Listing of any variables with variance equal to 0.
(3) Correlation Matrix
(4) Matrix of Means
(5) Matrix of Standard Deviations
(6) Matrix of No. of Subjects (observations)
(7) Matrix of Sums, Sum Squares, Cross Products

Note: Matrices of Means, Standard Deviations and N's are given for the maximum N that data occurs for any pair of variables (total N minus number of blanks for each or both observations for any pair of variables).

For example:

Variable		X_1	X_2	X_3
Observation	1.	58	72	38
	2.	93	b̸	12
	3.	b̸	b̸	29
	4.	72	59	b̸
	5.	48	70	34
	6.	b̸	72	b̸
	7.	b̸	b̸	b̸

Note: b̸ = blank in example above.

N_1 with N_2 = 3

N_1 with N_3 = 3

N_2 with N_3 = 2

Also, ΣX_1 for X_1 with X_2 = $58+72+48$ = 178

ΣX_1 for X_1 with X_3 = $58+93+48$ = 199

ΣX_2 for X_1 with X_2 = $72+59+70$ = 201

ΣX_2 for X_2 with X_3 = $72+70$ = 142

ΣX_3 for X_1 with X_3 = $38+12+34$ = 84

ΣX_3 for X_2 with X_3 = $38+34$ = 72

c. Limitations per problem:

(1) No. of variables ≤ 50
(Note: the matrix of ΣX_1 is not symmetrical)
(2) $N \leq 9999$
(3) Maximum of six variable format cards.

d. Estimation of running time and output per problem:

Note: Running time and output are dependent on the number of blanks, the number of variables, and the number of observations.

(1) Number of seconds
(2) Number of pages

2. ORDER OF CARDS IN A JOB DECK

a. System cards
b. Fortran or Binary deck
c. * Data Card
d. Problem Card
e. Variable Format Card
f. DATA INPUT CARDS (Place data input deck here if data input is from cards.)

3. CARD PREPARATION

d. Problem Card

(1) Cols. 1-2	a 2 digit integer indicating the number of variable format cards (NVF).
(2) Cols. 3-4	a 2 digit integer indicating the number of variables (m).
(3) Cols. 5-8	a 4 digit integer indicating the number of observations (N).

Note: All of the above constants must be punched right justified within the respective fields.

(4) Cols. 9-56 can contain 48 alphabetic characters for identification.

e. Variable Format Card.

4. COMPUTATIONAL PROCEDURE

(0) Initialize for new problem
(1) Problem card is checked to see if NVF$\geq$01
(2) Reads in one observation and

a. Checks for blanks
b. If no blanks calculate cumulative N, sum, sum of squares, sum of cross products for all M variables.

(3) Repeat (2) for all N observations
(4) Compute means, standard deviations, covariances, Pearson-r's.

Note: A check is made for variance$>$0. If any variance is 0, the row and column are printed with a note of "CVAR was equal to zero," and r is not computed (thus printed out as zero).

(5) Print out results.

5. Note: As described earlier, each r is calculated by using the sums, sums of squares, sums of cross products, and N's for the maximum number of observations for each pair of variables chosen.
The method used is the raw score formula for Pearson r.

APPENDIX I

COMPARISON OF MEAN SCORES AND STANDARD DEVIATIONS OF VIRGINIA EXTENSION AGENTS-AGRICULTURE, INDIANA COUNTY EXTENSION ADMINISTRATORS, AND MEN-IN-GENERAL ON THE STRONG VOCATIONAL INTEREST BLANK

COMPARISON OF MEAN SCORES AND STANDARD DEVIATIONS OF VIRGINIA EXTENSION AGENTS-AGRICULTURE, INDIANA COUNTY EXTENSION ADMINISTRATORS, AND MEN-IN-GENERAL ON THE STRONG VOCATIONAL INTEREST BLANK

Group	SVIB Scale	Virginia Extension Agents-Agriculture (N = 77)		Indiana County Extension Administrators (N = 79)		Men-In-General (N = 500)	
		Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
I	Artist	18.36	8.93	15.2	7.53	22.8	11.3
	Psychologist	23.36	10.17	20.7	9.57	-	-
	Architect	17.70	9.04	11.5	11.84	24.7	11.7
	Physician	27.81	10.75	26.1	11.25	-	-
	Psychiatrist	27.38	10.62	-	-	-	-
	Osteopath	32.99	9.80	29.4	13.77	-	-
	Dentist	23.84	8.89	15.8	9.52	25.8	12.1
	Veterinarian	35.31	10.74	31.3	8.24	-	-
II	Mathematician	16.34	9.06	13.2	8.93	20.7	13.0
	Physicist	13.22	10.78	12.8	8.36	-	-
	Chemist	22.31	11.00	20.7	8.30	25.0	15.0

COMPARISON OF MEAN SCORES, AND STANDARD DEVIATIONS ON SVIB
(continued)

Group	SVIB Scale	Virginia Extension Agents-Agriculture		Indiana County Extension Administrators		Men-In-General	
		Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
	Engineer	25.70	11.35	23.0	10.24	30.4	14.3
III	Production Manager	34.75	9.29	34.3	8.91	34.6	10.8
IV	Farmer	42.21	10.32	39.9	8.11	33.6	11.4
	Carpenter	24.30	12.28	20.0	10.92	20.2	14.5
	Forest Service Man	34.64	11.96	37.5	12.60	22.5	13.2
	Aviator	29.60	11.56	31.2	10.03	24.0	11.9
	Printer	28.97	8.91	30.6	8.79	28.5	11.3
	Math Science Teacher	36.43	9.86	36.9	8.39	28.7	12.9
	Industrial Arts Teacher	26.81	14.25	25.8	11.65	-	-
	Vocational Agriculture Teacher	41.66	12.58	39.7	8.78	-	-
	Policeman	32.56	9.09	29.9	6.03	27.4	10.6
	Army Officer	27.87	13.03	-	-	-	-

COMPARISON OF MEAN SCORES, AND STANDARD DEVIATIONS ON SVIB
(continued)

Group	SVIB Scale	Virginia Extension Agents-Agriculture		Indiana County Extension Administrators		Men-In-General	
		Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
V	Y.M.C.A. Physical Director	32.26	11.65	28.0	7.66	23.6	13.2
	Personnel Manager	30.74	12.62	35.3	13.01	27.7	13.3
	Public Administrator	41.49	10.21	48.7	11.14	31.7	11.4
	Vocational Counselor	37.65	10.72	-	-	-	-
	Physical Therapist	35.88	11.84	-	-	-	-
	Social Worker	29.78	12.35	35.6	10.48	-	-
	Business Education Teacher	35.12	12.43	-	-	-	-
	Social Science Teacher	35.68	12.06	39.3	8.63	26.0	13.9
	School Superintendent	29.35	10.38	34.7	8.10	22.9	13.7
	Minister	22.75	11.77	24.1	8.11	18.7	15.4
VI	Musician	24.44	9.65	17.6	11.30	-	-
	Music Teacher	26.40	11.75	-	-	-	-
VII	C.P.A. Owner	18.79	7.79	25.6	8.15	26.0	11.8

COMPARISON OF MEAN SCORES, AND STANDARD DEVIATIONS ON SVIB
(continued)

Group	SVIB Scale	Virginia Extension Agents-Agriculture		Indiana County Extension Administrators		Men-In-General	
		Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
VIII	Senior C.P.A.	32.86	9.14	43.6	10.48	-	-
	Accountant	27.57	9.64	37.7	11.19	29.2	12.5
	Office Worker	33.03	9.49	38.7	6.81	32.7	12.1
	Credit Manager	38.19	10.99	-	-	-	-
	Purchasing Agent	29.10	8.46	33.3	8.06	32.4	11.7
	Banker	34.31	8.44	33.2	6.00	31.8	9.9
	Pharmacist	32.32	7.82	33.0	6.35	-	-
	Mortician	33.74	9.01	36.3	5.79	-	-
IX	Sales Manager	32.10	8.59	31.9	7.82	31.4	11.6
	Real Estate Manager	37.73	6.95	38.0	5.18	35.7	10.0
	Life Insurance Salesman	33.84	9.39	36.8	8.02	30.9	11.8
X	Advertising Man	27.06	8.94	27.3	6.10	30.8	10.2

COMPARISON OF MEAN SCORES, AND STANDARD DEVIATIONS ON SVIB
(continued)

Group	SVIB Scale	Virginia Extension Agents-Agriculture		Indiana County Extension Administrators		Men-in-General	
		Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
	Lawyer	27.22	8.57	27.5	5.30	31.2	11.5
	Author Journalist	25.73	8.17	27.1	6.42	30.0	10.0
XI	President Mfg. Concern	31.79	7.73	32.6	9.45	34.6	12.5
Group I		31.08	8.04				
Group II		28.78	10.50				
Group V		41.86	10.20				
Group VIII		34.91	9.84				
Group IX		39.34	7.97				
Specialization Level		38.39	8.25				
Interest Maturity		53.66	6.47	58.4	5.27	-	-
Occupational Level		55.99	6.35	53.2	2.61	58.9	8.2
Masculinity-Femininity		47.17	9.81	49.4	7.44	46.6	9.6

APPENDIX J

MEANS, STANDARD DEVIATIONS, AND CORRELATION COEFFICIENTS OF ALL INDEPENDENT VARIABLES WITH DEPENDENT VARIABLES FOR TOTAL GROUP

MEANS, STANDARD DEVIATIONS. AND CORRELATION COEFFICIENTS (r) OF ALL INDEPENDENT VARIABLES TO DEPENDENT VARIABLES FOR TOTAL GROUP

(Note: The first correlation coefficient shown for each variable represents the correlation of that variable with the tenure criterion variable, total years employed. The second correlation coefficient shown for each variable represents the correlation of that variable with the performance criterion variable, performance rating index.)

Variable	N	Mean	Standard deviation	Correlation coefficient
Total Years Employed	77	9.31	6.68	1.00 -0.00
Performance Rating Index	77	50.03	12.02	-0.00 1.00
Service Rating Score	77	86.21	3.03	-0.10 0.70*
Adaptability Test Score	77	19.95	6.27	-0.45* 0.22
Age of Agent	77	36.44	10.82	0.85* -0.16
Scales on Strong Vocational Interest Blank-Men				
Group I				
Artist	77	18.36	8.93	-0.02 0.05
Psychologist	77	23.36	10.17	-0.08 0.01
Architect	77	17.70	9.04	-0.02 -0.08
Physician	77	27.81	10.75	-0.26* 0.00
Psychiatrist	77	27.38	10.62	-0.18 0.02
Osteopath	77	32.99	9.80	-0.34* 0.08
Dentist	77	23.84	8.89	-0.12 -0.17

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*Statistically significant at the .05 level

MEANS, STANDARD DEVIATIONS, AND CORRELATION COEFFICIENTS
(continued)

Variable	N	Mean	Standard deviation	Correlation coefficient
Veterinarian	77	35.31	10.74	-0.26* 0.05
Group II				
Mathematician	77	16.34	9.06	0.05 -0.05
Physicist	77	13.22	10.78	-0.10 -0.18
Chemist	77	22.31	11.00	-0.24* -0.15
Engineer	77	25.70	11.35	-0.21 0.14
Group III				
Production Manager	77	34.75	9.29	-0.29* -0.15
Group IV				
Farmer	77	42.21	10.32	-0.22 -0.01
Carpenter	77	24.30	12.28	-0.18 -0.21
Forest Service Man	77	34.64	11.96	-0.39* -0.12
Aviator	77	29.60	11.56	-0.51* -0.03
Printer	77	28.97	8.91	-0.20 -0.10
Math. Science Teacher	77	36.43	9.86	-0.22 -0.08
Industrial Arts Teacher	77	26.81	14.25	-0.23* -0.16
Voc. Agriculture Teacher	77	41.66	12.58	-0.16 -0.09
Policeman	77	32.56	9.09	-0.31* -0.04
Army Officer	77	27.87	13.03	-0.42* -0.08

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*Statistically significant at the .05 level

MEANS, STANDARD DEVIATIONS, AND CORRELATION COEFFICIENTS (continued)

Variable	N	Mean	Standard deviation	Correlation coefficient
Group V				
Y.M.C.A. Physical Director	77	32.26	11.65	-0.13 -0.03
Personnel Manager	77	30.74	12.62	-0.12 -0.15
Public Administrator	77	41.49	10.21	-0.30* -0.17
Vocational Counselor	77	37.65	10.72	-0.04 0.08
Physical Therapist	77	35.88	11.84	-0.30* 0.04
Social Worker	77	29.78	12.35	-0.03 0.09
Social Science Teacher	77	35.68	12.06	0.06 0.08
Business Education Teacher	77	35.12	12.43	-0.08 0.11
School Superintendent	77	29.35	10.38	0.16 0.09
Minister	77	22.75	11.77	0.14 -0.00
Group VI				
Musician	77	24.44	9.65	-0.02 0.06
Music Teacher	77	26.40	11.75	0.06 0.11
Group VII				
C.P.A. Owner	77	18.79	7.79	0.01 0.05
Group VIII				
Senior C.P.A.	77	32.86	9.14	-0.34* 0.07
Accountant	77	27.57	9.64	-0.08 -0.03

---

*Statistically significant at the .05 level

MEANS, STANDARD DEVIATIONS, AND CORRELATION COEFFICIENTS
(continued)

Variable	N	Mean	Standard deviation	Correlation coefficient
Office Worker	77	33.03	9.49	-0.00 -0.02
Credit Manager	77	38.19	10.99	-0.13 0.12
Purchasing Agent	77	29.10	8.46	-0.12 -0.04
Banker	77	34.31	8.44	0.14 0.08
Pharmacist	77	32.32	7.82	-0.08 -0.02
Mortician	77	33.74	9.01	-0.00 -0.01
Group IX				
Sales Manager	77	32.10	8.59	0.11 0.11
Real Estate Manager	77	37.73	6.95	0.14 0.01
Life Insurance Salesman	77	33.84	9.39	0.23* 0.05
Group X				
Advertising Man	77	27.06	8.94	0.14 0.11
Lawyer	77	27.22	8.57	0.10 0.15
Author-Journalist	77	25.73	8.17	0.16 0.05
Group XI				
President Mfg. Concern	77	31.79	7.73	0.07 -0.11
Group I	77	31.08	8.04	-0.06 -0.08
Group II	77	28.78	10.50	-0.24* -0.14
Group V	77	41.86	10.20	0.07 0.05

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*Statistically significant at the .05 level

MEANS, STANDARD DEVIATIONS, AND CORRELATION COEFFICIENTS
(continued)

Variable	N	Mean	Standard deviation	Correlation coefficient
Group VIII	77	34.91	9.84	0.00 -0.03
Group IX	77	39.34	7.97	0.20 0.11
Specialization Level	77	38.39	8.25	-0.00 0.01
Interest Maturity	77	53.66	6.47	-0.03 0.04
Occupational Level	77	55.99	6.35	0.15 0.08
Masculinity-Femininity	77	47.17	9.81	-0.32* 0.02
Formal Training Analysis: For Undergraduate Curriculum				
Hours in Plant Sciences	63	26.89	15.11	0.00 -0.02
G.P.A. in Plant Sciences	59	1.75	0.62	-0.16 -0.04
Hours in Animal Sciences	63	40.95	24.01	-0.22 0.03
G.P.A. in Animal Sciences	57	2.05	0.49	-0.28* 0.01
Hours in Mechanical Sciences	63	10.89	12.00	0.10 -0.19
G.P.A. in Mechanical Sciences	56	1.82	0.62	-0.46* -0.11
Hours in Basic Sciences	63	56.65	22.23	-0.25 0.11
G.P.A. in Basic Sciences	59	1.05	0.57	-0.03 -0.22
Hours in Humanities	63	10.21	9.22	-0.36* 0.08
G.P.A. in Humanities	50	1.09	0.62	-0.11 -0.05
Hours in Social Sciences	63	51.22	21.92	-0.24 -0.05
G.P.A. in Social Sciences	59	1.47	0.49	-0.14 -0.15

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*Statistically significant at the .05 level

MEANS, STANDARD DEVIATIONS, AND CORRELATION COEFFICIENTS
(continued)

Variable	N	Mean	Standard deviation	Correlation coefficient
Hours in Education	63	0.62	1.51	-0.06 -0.39*
G.P.A. in Education	10	1.75	0.60	0.02 -0.17
Hours in Ext. Education	63	0.97	1.67	-0.05 -0.04
G.P.A. in Ext. Education	17	2.06	0.62	0.30 0.14
Hours in Agr. Education	63	4.44	8.83	-0,15 -0.30*
G.P.A. in Agr. Education	26	2.11	0.59	0.12 -0.07
Hours in Psychology	63	3.16	3.08	-0.12 -0.14
G.P.A. in Psychology	39	1.31	0.69	-0.15 -0.38*
Hours in Economics	63	14.94	10.59	0.08 0.22
G.P.A. in Economics	58	1.72	0.64	-0.17 -0.08
Hours in Sociology	63	4.03	3.51	-0.17 -0.10
G.P.A. in Sociology	43	1.72	0.66	-0.13 -0.12
Hours in Communications	63	15.97	5.48	-0.24 -0.06
G.P.A. in Communications	59	1.08	0.63	-0.11 -0.18
Hours in Business and Public Administration	63	3.37	6.21	0.01 -0.03
G.P.A. in Business and Public Administration	24	1.66	0.73	0.10 -0.03
Hours in History, Political Science and Government	63	4.13	4.20	-0.57* 0.08
G.P.A. in History, Political Science and Government	38	1.00	0.91	-0.02 -0.06

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*Statistically significant at the .05 level

MEANS, STANDARD DEVIATIONS, AND CORRELATION COEFFICIENTS (continued)

Variable	N	Mean	Standard deviation	Correlation coefficient
Total Hours Attempted in Undergraduate Curriculum	63	209.67	51.95	-0.34* 0.04
Total Hours Failed in Undergraduate Curriculum	62	9.66	12.98	-0.23 0.12
G.P.A. in Undergraduate Curriculum	59	1.54	0.43	-0.15 -0.11
Formal Training Analysis: For All Formal Training Beyond Undergraduate Curriculum				
Hours in Plant Sciences	64	1.56	5.98	0.12 -0.07
G.P.A. in Plant Sciences	14	2.62	0.46	-0.52 0.60*
Hours in Animal Sciences	64	0.95	6.22	-0.06 -0.00
G.P.A. in Animal Sciences	5	1.80	0.40	0.71 -0.82
Hours in Mechanical Sciences	64	0.50	1.94	-0.02 -0.13
G.P.A. in Mech. Sciences	6	2.26	0.70	-0.27 0.10
Hours in Basic Sciences	64	0.39	1.56	0.05 -0.06
G.P.A. in Basic Sciences	5	2.00	0.63	0.37 -0.91*
Hours in Humanities	64	0.00	0.00	0.00 0.00
G.P.A. in Humanities	0	0.00	0.00	0.00 0.00
Hours in Social Sciences	64	4.28	8.74	-0.13 -0.14
G.P.A. in Social Sciences	27	2.14	0.84	-0.61* 0.11
Hours in Education	64	0.45	2.21	-0.07 -0.14

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*Statistically significant at the .05 level

MEANS, STANDARD DEVIATIONS, AND CORRELATION COEFFICIENTS (continued)

Variable	N	Mean	Standard deviation	Correlation coefficient
G.P.A. in Education	3	2.50	0.41	0.93 9.50
Hours in Ext. Education	64	0.83	2.01	-0.17 -0.13
G.P.A. in Ext. Education	11	2.32	0.44	-0.08 0.42
Hours in Agr. Education	64	1.11	4.47	-0.03 -0.09
G.P.A. in Agr. Education	7	2.40	0.66	-0.70 -0.09
Hours in Psychology	64	0.09	0.52	-0.16 0.01
G.P.A. in Psychology	2	2.50	0.50	-1.00 -1.00
Hours in Economics	64	1.19	2.24	-0.02 0.22
G.P.A. in Economics	17	2.07	0.85	-0.57* 0.42
Hours in Sociology	64	0.23	1.33	-0.15 -0.01
G.P.A. in Sociology	2	1.75	0.25	1.00 1.00
Hours in Communications	64	0.17	0.67	-0.05 -0.04
G.P.A. in Communications	4	1.75	1.09	-0.95* 0.17
Hours in Business and Public Administration	64	0.20	1.17	-0.10 -0.12
G.P.A. in Business and Public Administration	3	2.44	0.42	0.42 -0.28
Hours in History, Political Science and Government	64	0.00	0.00	0.00 0.00
G.P.A. in History, Political Science and Government	0	0.00	0.00	0.00 0.00
Total Hours Attempted Beyond Undergraduate Curriculum	64	7.75	14.65	-0.05 -0.09

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*Statistically significant at the .05 level

MEANS, STANDARD DEVIATIONS, AND CORRELATION COEFFICIENTS
(continued)

Variable	N	Mean	Standard deviation	Correlation coefficient
Total Hours Failed Beyond Undergraduate Curriculum	64	0.00	0.00	0.00 0.00
G.P.A. Beyond Undergraduate Curriculum	31	2.27	0.62	-0.48* 0.27

*Statistically significant at the .05 level

G.P.A. = Grade Point Average

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Virginia Polytechnic Institute	1953-1958	B.S.	1958
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Positions held:

- Virginia Agricultural Extension Service
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    - Pittsylvania County, 1958-1959
    - Grayson County, 1959-1960
    - Scott County, 1960-1961
  - County Agent
    - Dickenson County, 1961-1962
- Wood-Howell Nurseries, Inc., Bristol, Virginia
  - Landscape Designer, 1962-1963
- Virginia Cooperative Extension Service
  Blacksburg, Virginia
  - Assistant County Agent, Smyth County, 1963-1965
  - National 4-H Fellow, U.S.D.A., 1965-1966
  - Program Leader, 4-H, 1966-

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